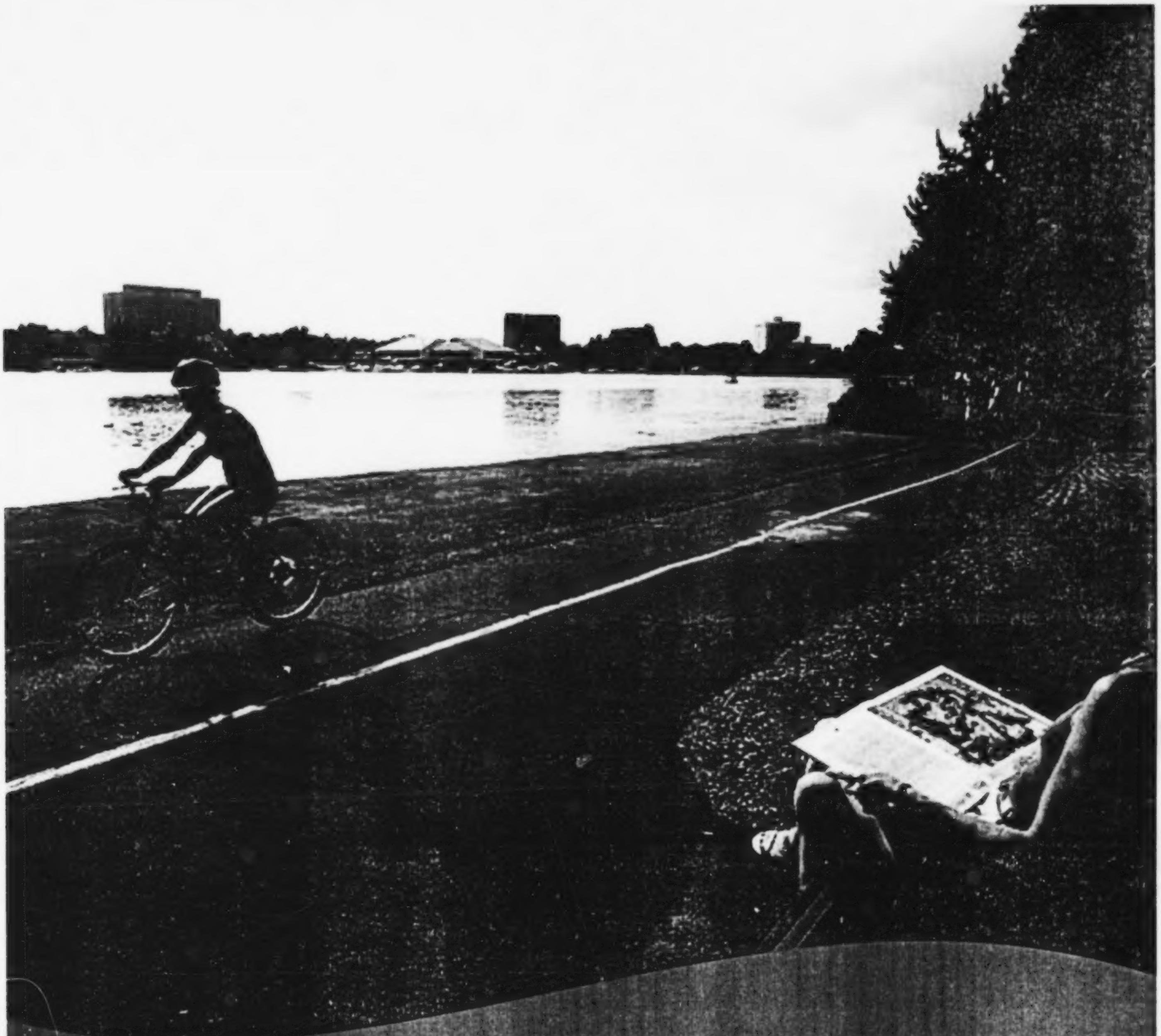


Smog Alert Response

A Municipal Guide To Action

Protecting our environment.

Ontario

ACKNOWLEDGEMENTS

In the development of this guide, the Ministry of the Environment has relied heavily on the recommendations and information provided by the municipalities across Ontario. Municipalities large and small generously provided their time, knowledge and expertise throughout the extensive process and the Ministry would like to acknowledge their contribution in making this document possible.

Among others, the Ministry would like to acknowledge the following partners:

Association of Municipalities of Ontario (AMO)
City of Barrie
City of Brampton
City of Burlington
City of Greater Sudbury
City of Guelph
City of Hamilton
City of Kingston
City of London
City of Mississauga
City of Ottawa
City of Thunder Bay
City of Toronto
City of Vaughan
City of Windsor
Clean Air Partnership
County of Lambton
EcoPerth
Environment Canada
Federation of Canadian Municipalities (FCM)
Greater Toronto Area Clean Air Council
Health Canada
Ministry of Health and Long-Term Care
Ministry of the Environment
Municipality of Clarington
Natural Resources Canada
Ontario Lung Association
Ontario Medical Association (OMA)
Peterborough City and County Health Unit
Region of Durham
Region of Halton
Region of Niagara
Region of Peel
Region of Waterloo
Region of York
Town of Caledon
Town of Cobalt
Town of East Gwillimbury
Town of Markham
Town of Milton
Town of Newmarket
Town of Oakville
United States Environmental Protection Agency
Windsor-Essex County Environmental Committee

***It is important to note that due to space restrictions not all municipal programs could be referenced*

To request additional copies of the Municipal Guide and Resource Kit please address correspondence to:

Smog Alert Response Program (SARP)
Environmental Monitoring and Reporting Branch
Ontario Ministry of the Environment
125 Resources Rd., West Wing
Etobicoke, ON M9P 3N6

TABLE OF CONTENTS

INTRODUCTION 1

SECTION 1: THE BASICS OF AN EFFECTIVE SMOG RESPONSE PROGRAM 3
- a) The Rationale for Program Development 3
- b) The Role of Municipalities 4
- c) The Smog Alert Response Plan 4
  - i. The Importance of High-level Municipal Support 4
  - ii. Assigning a Coordinator 5
  - iii. Establishing a Departmental Committee/Development Team 6
  - iv. Developing a Local Smog Alert Response Plan 6
- d) Local Poor Air Quality 11
- e) Beyond the Traditional Smog Season 11

SECTION 2: EXPANDING PROGRAM SCOPE, INFLUENCE, AND IMPACT 13
- a) The Legal Impetus 13
- b) Community Outreach and Education 14
  - i. External Notification Process 14
  - ii. The Evolving Role of the Smog Alert Response Steering Committee 16
  - iii. Public Education: Information Packages and Promotional Materials 16
- c) Strengthening Partnerships – Pooling Resources 17
  - i. Federal, Provincial and Municipal Partnerships 17
  - ii. Partnering with the Health Community 20
  - iii. Partnering with Not for Profit Organizations, Associations and other Stakeholders 20
- d) Reducing Local Emissions 21
- e) The Importance of Research 21
- f) Linkages with Other Municipal Priorities 22
  - i. Greening Communities 22
  - ii. Energy Conservation 24
  - iii. Land-Use Planning 24
  - iv. Transportation Demand Management 25
  - v. Climate Change and Alternative Energy 25
  - vi. Economics and Smog 27

SECTION 3: MUNICIPALITIES IN ACTION 29
- a) Corporate Planning to Address Air Quality 29
- b) Municipal Improvement through Research 31
- c) Private Sector Involvement and Initiatives 32
- d) Reducing Vehicle Emissions: Anti-Idling Programs 32
- e) Reducing Vehicle Emissions: Transit Initiatives 34
- f) Reducing Travel by Curbing Urban Sprawl 35
- g) Energy Conservation: Audits and Management Studies 36
- h) Energy Conservation Initiatives 38
- i) Promoting Renewable Energies 39

- j) Greening Initiatives 40
- k) Education/Outreach 41

SECTION 4: THE SCIENCE OF SMOG 44

- a) Smog Constituents and Their Characteristics 44
  - i. Ground-Level Ozone (O_3) 44
  - ii. Fine Particulate Matter ($PM_{2.5}$) 46
- b) Major Precursors of Smog 47
  - i. Volatile Organic Compounds (VOCs) 47
  - ii. Nitrogen Dioxide (NO_2) 47
  - iii. Sulphur Dioxide (SO_2) 47
  - iv. Ammonia (NH_3) 47
  - v. Carbon Monoxide (CO) 48
- c) Smog and Geography 48
- d) Smog and Meteorology 48
- e) Monitoring and Reporting of Smog in Ontario 50
  - i. The Air Quality Index (AQI) and Monitoring Network 50
  - ii. The Provincial Smog Alert Program 51
  - iii. Co-operative Activities with Michigan and Quebec 52
  - iv. The Smog Alert Response Program (SARP) 53

SECTION 5: SAMPLE MUNICIPAL OPERATIONAL PLAN 54

- a) General Municipal Actions 54
- b) Department/Division Specific Actions 55

RESOURCE KIT FOR MUNICIPALITIES 62

1. Contracts and Policies 64
2. By-Laws 70
3. Internal and External Notification 75
4. Initiatives 85
5. Promotional Material 89
6. Useful Links 94

INTRODUCTION

Municipalities play a key role in fighting smog and many are taking action. Since 1998, six regions, two counties, three single tier[1] municipalities and some 20 lower tier[2] and separated[3] municipalities have developed smog alert response plans. As outlined in this document, many of these plans are in operation with municipalities developing departmental plans and procedures, supporting by-laws, and education and outreach programs to increase awareness and reduce local emissions.

Other municipalities are taking notice and are considering or implementing their own action plans. For example, a number of the 30 upper tier[4] municipalities, 11 single tier municipalities and 404 lower tier and separated municipalities across Ontario have contacted the Ministry of the Environment, the Association of Municipalities and the aforementioned municipalities with questions and ideas about local actions that could potentially lead to cleaner air.

The impetus is largely driven by the growing awareness of the effects of smog on human health. As stated by Dr. David McKeown, the former Medical Officer of Health of Peel Region at the 2004 GTA Smog Summit, "There are now several hundred published studies linking air pollution and human illness." Citizens want their governments to take action to protect their health, which would also benefit the environment.

For a number of municipalities, the transportation sector is a significant source of local emissions with other significant sources including the use of oil, natural gas and wood as fuel for space heating and electrical generation. Large point sources such as electricity generating stations, steel plants, refineries and cement plants in Southwestern Ontario are also important contributors of the precursors of ozone and fine particulate matter ($PM_{2.5}$). However, it needs to be recognized that a significant percentage of the ozone and fine particulate matter that affects Ontario during smog episodes is emitted from sources in the mid-western United States.

Municipalities are well positioned to make a difference. Local and regional governments are often responsible for land use planning, public transit, municipal facilities, park space, traffic and other by-laws. In collaboration with other levels of government, municipalities can reduce emissions from the transportation, electricity and other sectors, promote the greening of communities, develop more effective land use planning, support social marketing efforts, and establish by-laws and regulatory mechanisms to build capacity and change behaviour.

Municipalities are currently at different stages of implementing smog related action plans. Some communities are growing rapidly, developing a collective vision to guide choices by establishing priorities, integrating plans and realizing effective partnerships in service delivery. Others are just beginning and need the framework for establishing a Steering Committee, garnering support, getting their plan approved through Council, etc.

This guide to smog alert response is the second document of this type to be released by the Ministry of the Environment. The first document was released in 1999 when municipalities were beginning to develop their smog alert response plans. The current version is intended to serve a number of purposes:

1. To highlight the noteworthy initiatives already underway in municipalities across Ontario;
2. To provide accurate, current information on the science of smog including health impacts, smog constituents and

---

[1] The term "single tier municipality" refers to places where there is only one level of municipal government in an area (i.e., Toronto)

[2] The term "lower tier municipality" refers to places where there is a higher level of municipal government like a county or region involved in providing services to residents.

[3] The term "separated municipality" refers to places that, although geographically part of a county, are not under the governance of the county (includes such cities as Windsor, London, Kingston, Peterborough, Guelph, etc.)

[4] Upper Tier Municipalities – includes all counties, regions and the District of Muskoka. Ontario districts other than Muskoka are territorial boundaries and do not serve any municipal government purpose.

characteristics, the meteorology and sources of smog as well as the monitoring and reporting of smog in Ontario;

3. Based on municipal experiences to develop a road-map for municipalities beginning to consider a smog-response strategy complete with templates and a toolkit of information; and
4. To analyze existing programs and procedures across Ontario and to provide an organizational framework to understand the breadth and range of municipal initiatives which may have value for municipalities with established smog alert response programs.

Indeed, there is a wealth of information available in Ontario. The foundation for this guide comes from these municipal initiatives which have been steadily evolving over the past seven years. Through our research we have learned what is helping municipalities be successful and throughout the document have attempted to capture the "lessons learned". These include:

- The importance of linking air quality issues with other municipal priorities.
- The benefits of both building community awareness/support while also developing and implementing appropriate by-laws.
- The merits of pooling resources – financial and knowledge-related.
- The economic and environmental benefits of reducing emissions from municipal facilities and operations.
- The value of research to further our knowledge and convince Council – local emission related, health based, social marketing, etc.
- The potential impact of purchasing decisions relating to vehicles and equipment which can reduce emissions.
- The merits of regional initiatives, and better cooperation between all levels of government.
- The importance of community advocacy to change attitudes and behaviour.
- The development of innovative communications strategies through Web sites and other media to alert municipal employees and other stakeholders.
- The impact of land use planning and greening initiatives such as the establishment of green roofs.
- The significance of ownership when municipal divisions take responsibility for their smog response action plans.

The choices governments make matter. Municipalities have an important role in reducing greenhouse gases (GHGs) and other air pollutants. Governments need to continue to collectively work together, pooling experience and information to better understand how to deal with the effects of smog, to protect the most vulnerable members of the communities, and to minimize the contributions to the air quality problem in Ontario. The knowledge gained through municipal experiences in implementing smog alert response plans is an important component of this process.

SECTION 1: THE BASICS OF AN EFFECTIVE SMOG RESPONSE PROGRAM

THE RATIONALE FOR PROGRAM DEVELOPMENT

Many epidemiological and toxicological studies conducted in countries around the world have demonstrated that poor air quality can have a profound impact on human health.

The elderly population, especially those with cardiac or respiratory diseases such as asthma, emphysema, and chronic bronchitis, are particularly sensitive to air pollutants. Children are particularly sensitive to the adverse health effects of air pollution due to their breathing patterns, as their rate of respiration is documented to be greater than that of adults and they retain greater quantities of particles per unit body weight than adults. They are also generally more active outdoors than adults, especially during the summertime when ozone levels are at their highest. Furthermore, according to the U.S. Environmental Protection Agency (EPA), people already suffering from decreased lung function due to pre-existing lung disease cannot tolerate an additional reduction in lung function due to smog.

There has been an increasing body of research on the linkages between air quality and health, the most recent of which were two new studies published by the American Lung Association in 2004 which links exposure to smog to a significant increase in premature death in the U.S. *The New England Journal of Medicine* had published a similar study on the linkages between fine particulate air pollution and mortality in the U.S. four years earlier. A 2002 article in the *Medical Journal of Australia*, which also examined the health impacts of air pollution, similarly concluded that urban air pollution levels are associated with increased mortality and cardio respiratory mortality. The OMA reported in 2000 that air pollution was costing Ontario citizens at least $1 billion a year in direct costs for hospital admissions, emergency room visits and absenteeism. In 2003, the World Health Organization released a report which focused on the health effects of particulate matter, ozone, and nitrogen dioxide and a fact sheet identifying the main health effects to children of exposure to environment risk factors, including asthma and allergies. According to the EPA, even moderately exercising healthy adults can experience a 15 to 20 per cent reduction in lung function from exposure to low levels of ozone over several hours.

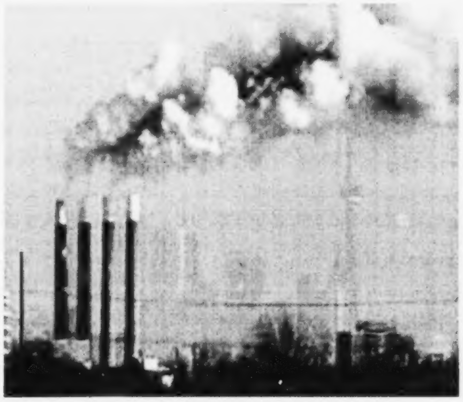
Recognizing the linkages between air quality and health, the federal government has been leading a process to explore the development of a multi-pollutant National Air Quality Index that would accurately reflect the health risk associated with several types of air pollutants on an ongoing basis.

There is no doubt that smog constituents have harmful effects on human health, however, the extent to which effects are experienced is dependent on the duration and intensity of exposure to these pollutants. In general, longer exposures to smog result in a greater chance of experiencing adverse health impacts. People's sensitivities to smog vary a great deal; therefore the impact of smog on one's health will depend on a number of factors including:

- The levels and types of pollutants in the air;
- Age and general state of health;
- Weather conditions;
- Length of exposure; and
- Where one lives.

The bottom line is that smog and its components aggravate a wide range of health problems – problems that are especially acute for people who suffer from respiratory illnesses such as chronic bronchitis and asthma, and for those that suffer from cardiac problems. As smog is a mixture of pollutants, these adverse health impacts can worsen with simultaneous exposures to multiple pollutants.

THE ROLE OF MUNICIPALITIES



Municipalities play an especially important role in combating smog, since it is within communities that actions can be taken to reduce local emissions, to inform and advise citizens about smog, and to facilitate efforts to reduce the release of air pollutants, especially during smog alerts. Recognizing the importance of this role, a number of Ontario municipalities have taken the initiative to implement smog response action plans.

The smog alert response plans identify processes the municipality can take to notify the community in the event a smog advisory is issued by the Ministry of the Environment. It also often includes outreach initiatives to increase public awareness about smog, and actions the municipality can implement to reduce smog emissions from municipal operations, such as reducing energy consumption, minimizing the use of solvents and oil-based paints, and re-scheduling the use of small engines for grounds maintenance and landscaping.

The essence of an effective response to a smog alert is education and communication. Municipalities, as the contact point for the local communities they serve, have an important role in getting the word out to vulnerable people, hospitals and health workers, seniors' homes, schools, area businesses and local industries. Ensuring that staff especially those dealing with public health issues are trained, aware of their roles and responsibilities and are informed promptly when an alert is issued is vital to an effective smog alert response.

THE SMOG ALERT RESPONSE PLAN

The Importance of High-level Municipal Support

Municipal experience indicates higher-level support and commitment from senior management and council is an important element in the implementation of a successful smog response policy and the establishment of a plan and process to respond to smog alert notifications. Evidence of this connection between higher-level support and effective smog response include:

- The City of Mississauga – senior management supported the 1998 pilot smog response plan by expanding it corporate-wide in 1999;
- Halton Region – the Medical Officer of Health provided substantial political support to the region;
- The City of Burlington – Council has been very supportive of actions relating to air quality issues; and
- The City of Barrie – a local councillor championed the recommendation to implement a smog alert policy.

When that commitment takes the form of a corporate policy, municipal and regional councils ensure that the process of responding to a smog alert is instituted and integrated into municipal or regional day-to-day operations. They also provide their staffs with a mandate for local action.

Although councils differ in composition between municipal levels (i.e., regions vs. towns) and types (i.e., cities vs. townships, regions vs. counties), the role of the council remains the same (according to the *Municipal Act*, 2001, c. 25, s. 224):

- To represent the public and consider the well-being and interests of the municipality;
- To develop and evaluate the policies and programs of the municipality;
- To determine which services the municipality provides;
- To ensure that administrative practices and procedures are in place to implement the decisions of council;
- To maintain the financial integrity of the municipality; and
- To carry out the duties of council under the Municipal or any other Act.

Many municipalities have recognized the need for high-level support and commitment, but are unsure of how to go about garnering this support. To bring an issue to the attention of the council, reports, recommendations, and/or motions are often prepared by municipal committees. In the case of the City of Ottawa, the joint Planning and Environment Committee and the Health, Recreation, and Social Services Committee recommended that Council adopt a 2004 Action Plan for Smog and the ongoing planning and coordination of smog and heat mitigation activities. The recommendations have also been submitted by members of council themselves, as was the case with the City of Barrie. The motion was tabled by a local councillor from the general committee that recommended the city work in conjunction with EcoHealth to develop a smog alert policy. (Refer to page 69 for a copy of this recommendation).

After a smog response policy has been established, local councils can support the process by encouraging local business and industry to reduce their emissions of smog-producing chemicals, and by encouraging municipal organizations, community leaders and constituents to suspend or curb those activities that add to the smog problem. Notification of a smog alert from the Ministry of Environment will be the trigger which sets the municipality response in motion. Longer term actions to reduce smog-producing emissions and implement energy-saving practices and processes can also be implemented on an ongoing basis.

Assigning a Coordinator

Municipalities often assign the task of developing and coordinating the smog alert response program to a staff person with responsibility for municipal environmental matters. At the City of Mississauga, the position responsible for environmental coordination was initially located in the City Manager's Office to provide high profile. The position was later transferred to the operating department because they had an increasing number of environmental issues, such as smog and climate change. Whether a municipality assigns the responsibility to an existing employee (the most common practice) or creates a new position dedicated to air quality issues, such as the City of Hamilton's Clean Air Coordinator, the smog alert response program coordinator should have a clear mandate, with enough autonomy and authority to make program-related decisions and communicate regularly with senior management.

There are several ways to appoint a Smog Alert Response Program Coordinator. A notice could be issued to all managers from the mayor/council/senior management/medical officer of health asking them to consider nominating an employee. Alternatively, a request for volunteers from each municipal department or division could be made. These volunteers could then form a smog response committee and one individual could then be selected as the Response Coordinator.

Senior management and council need to support the response program coordinator and promote the activities conducted by the coordinator to increase staff awareness and involvement and to ensure departmental "buy-in." This could be accomplished through the distribution of a memo at the start of each traditional smog season identifying the coordinator, their role and their purpose of the program. Introductory memos to all municipal staff are more effective if they come from someone at the top, such as the Mayor, the City Manager, or the Chief Administrative Officer. A separate memo from senior management from each division to its staff is also helpful as a reminder to divisions on their operation specific duties during a smog alert (refer to page 79 for a sample memo from the City of Toronto's Medical Officer of Health).

To be effective, the response coordinator will require communications support. In larger municipalities, this will mean support from a communications department. In smaller municipalities, it will mean support from a communications staff person, whether full-time or on call. Employee education and training and an efficient communications process during smog alerts are the key elements of a successful response.

Some municipalities assign a smog alert response program coordinator first, while others establish an interdepartmental or corporate committee. Regardless of the order, the majority of municipalities have found the combination of these two entities highly useful.

Establishing a Departmental Committee/Development Team

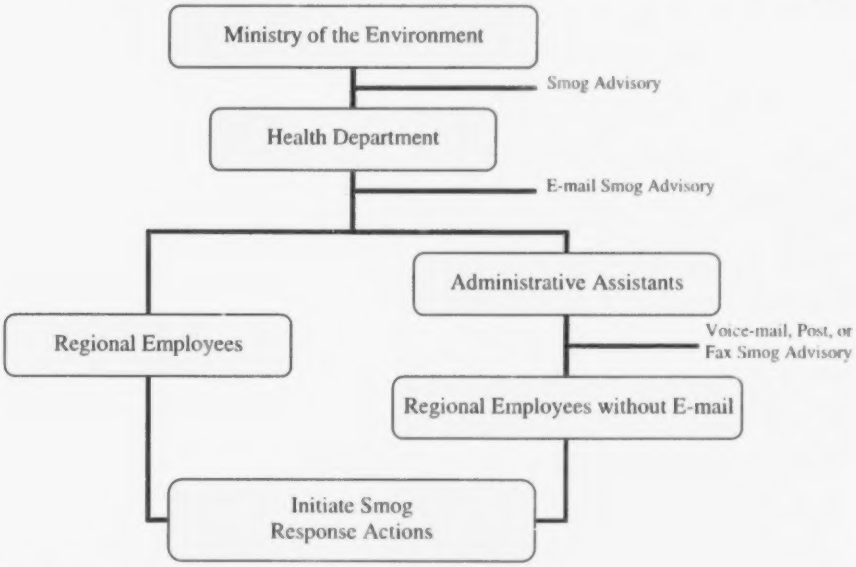
Many municipalities establish a senior-level committee representing all municipal departments. Representatives on the committee could be given the responsibility of preparing a list of operational procedures and actions their department will be committed to implementing on smog alert days. These operational procedures and actions could then be compiled and incorporated into the local smog alert response plan or be developed as a supporting document.

Developing a Local Smog Alert Response Plan

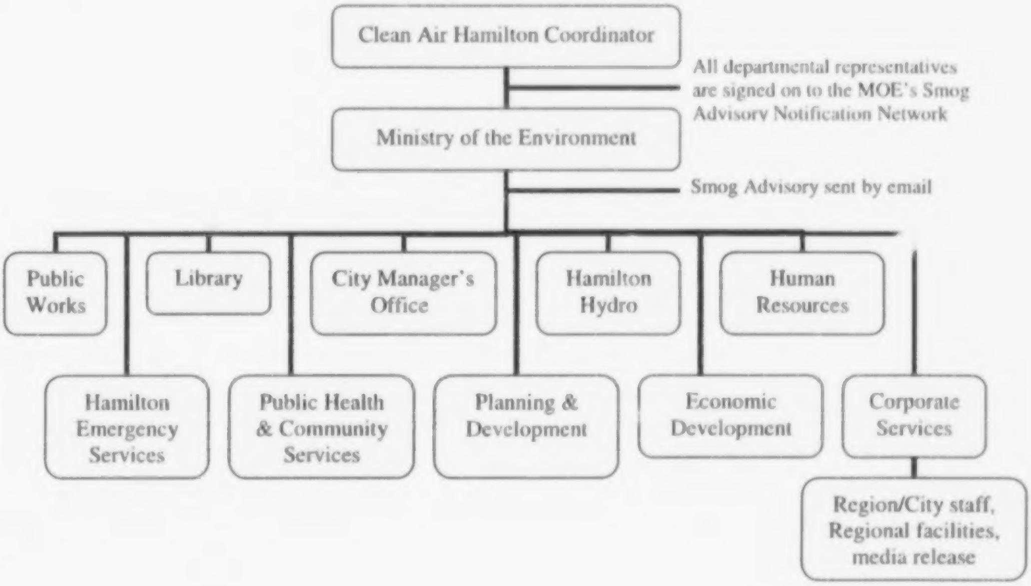
Internal Notification Process

Under the local smog response program, a contact person may be identified for each municipal department. In many cases, the contact person is the departmental committee representative; however, this does not have to be the case. Since the contact person is the first person in the department notified by the program coordinator of a smog alert, the individual assigned to this responsibility ideally could be someone that arrives at work early enough to inform their colleagues prior to the commencement of daily operations. The contact person is then responsible for informing staff in his or her department of the situation. Because smog episodes typically occur during the warmest seasons, they generally coincide with the most popular times for staff vacations. As such, many municipalities find it useful to identify back-up contact people for each department.

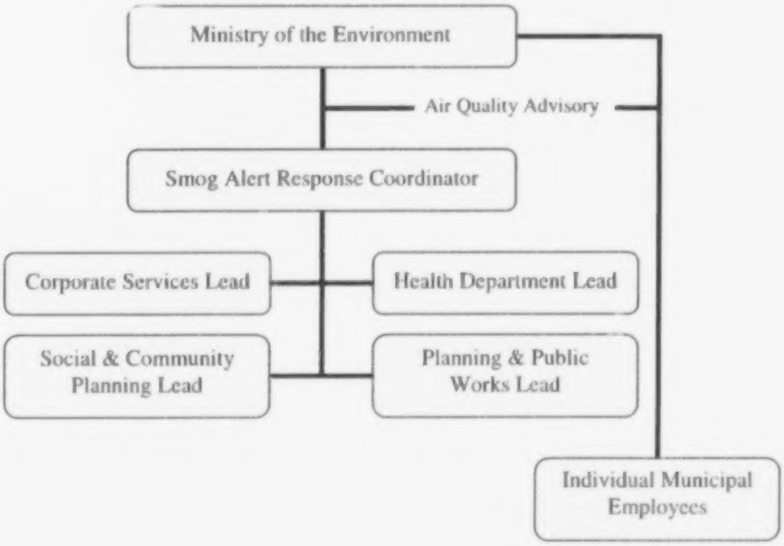
The notification process will differ between municipalities depending on their size and internal structure. Some municipalities tend to use some variation of the “fan-out” notification style, such as Durham Region:


Ministry of the Environment
Smog Advisory
Health Department
E-mail Smog Advisory
Administrative Assistants
Regional Employees
Voice-mail, Post, or Fax Smog Advisory
Regional Employees without E-mail
Initiate Smog Response Actions

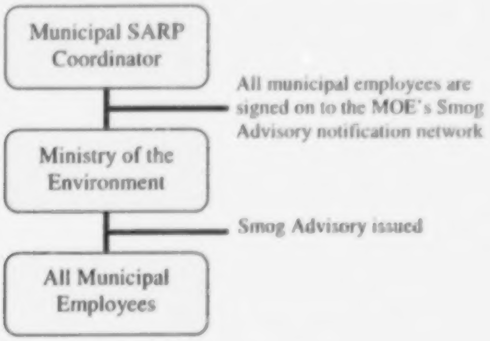
A number of municipalities, such as the City of Hamilton, have leaned towards a direct notification process where the response program coordinator signs up key employees (and a back-up) responsible for the implementation of smog alert response actions to the MOE's Smog Advisory Network, and all other employees are encouraged to sign up th[illegible]selves:

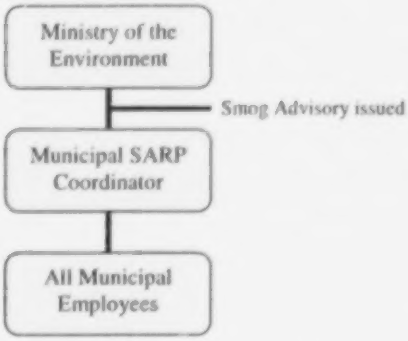

Clean Air Hamilton Coordinator
All departmental representatives are signed on to the MOE's Smog Advisory Notification Network
Ministry of the Environment
Smog Advisory sent by email
Public Works
Library
City Manager's Office
Hamilton Hydro
Human Resources
Hamilton Emergency Services
Public Health & Community Services
Planning & Development
Economic Development
Corporate Services
Region/City staff, Regional facilities, media release

Some municipalities may prefer to combine the two styles as department heads are notified directly by the municipality, while individual employees are encouraged to sign themselves on to the MOE's notification network at www.airqualityontario.com/alerts/signup.cfm


Ministry of the Environment
Air Quality Advisory
Smog Alert Response Coordinator
Corporate Services Lead
Health Department Lead
Social & Community Planning Lead
Planning & Public Works Lead
Individual Municipal Employees

Smaller municipalities may not require such an extensive notification process, but rather may prefer to have the municipal SARP coordinator sign all employees on to the MOE's smog advisory notification network, or have the response program coordinator disseminate the smog advisory to all employees:


Municipal SARP Coordinator
All municipal employees are signed on to the MOE's Smog Advisory notification network
Ministry of the Environment
Smog Advisory issued
All Municipal Employees



If clear response guidelines and an effective communications procedure are in place and understood, implementation of the smog alert response plan should not have an adverse effect on municipal operations. To get to that point, however, buy-in from municipal employees is important. An effective strategy to obtain employee buy-in is to work from the ground-level soliciting ideas or recommendations of what can be done before and during an alert. This can translate into employee expectations of their own potential in reducing smog precursors and contribute to overall corporate buy-in. It is important that staff clearly understand their roles in the program, the actions that each department is expected to take during a poor air episode, and the importance of implementing these actions.

Ideally, notification of a local smog alert may provide basic information on the situation, including:

- the smog alert process;
- the health and environmental implications of poor air quality;
- recommended actions in the event that employees or family members exhibit symptoms of exposure to poor air quality; and
- suggestions on personal or group actions to minimize emissions of ozone precursors and other smog-related pollutants.

Municipal early-warning efforts will help to ensure that those community members who are most at risk will be informed in advance so that they can take the necessary precautions to protect their health.

Planning an effective municipal response to a regional smog alert should not require a significant allocation of resources or staff time. But an effective response does require careful organization, and a commitment at the highest levels of the municipality to managing the response program effectively.

Operational Procedures/Departmental Actions

Municipalities can implement a range of internal activities to respond to smog alerts, either through specific department staff modifying their operations and/or all employees adjusting their activities to minimize the release of smog-producing pollutants. For example, municipalities can modify operations such as suspending tree-cutting and lawn mowing, painting with oil-based paint, road paving, and minimizing the use of trucks and other heavy equipment. Actions that all employees may implement or support include for example, restricting the refueling of vehicles during daylight hours, rescheduling discretionary local travel where possible and authorizing staff to telework during smog alerts.

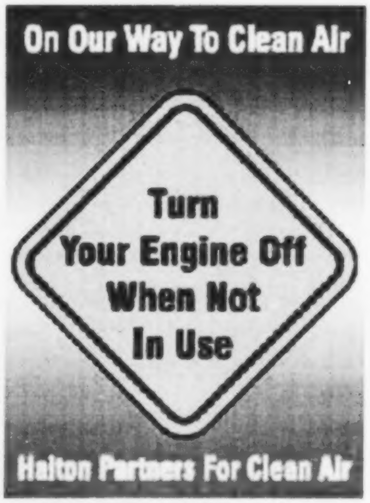
As part of the development of the smog alert response plan, some municipalities developed a list of general actions to minimize the release of smog-producing pollutants that apply to all employees, as well as actions specific to the individual municipal department. However, depending on the size and internal structure of a municipality, some may find other models more effective. For instance, the City of Mississauga developed one general list and assigned the municipal actions to specific departments. Smaller municipalities may find assigning a specific employee a more effective method. Halton Region developed a list of general municipal actions and grouped them by strategies that can be implemented year-round, strategies that can be implemented during the traditional smog season (May to September), strategies that can be implemented when a smog advisory is issued, and longer term strategies.

Those municipalities that have leaned towards the development of department specific actions that can be taken on smog alert days, have often used the department representatives that sit on the smog alert response plan development committee. For instance, each department lead in Durham Region prepared a list of possible actions and strategies that could be implemented on smog days. The leads consulted with their departmental colleagues to ensure that the list was as comprehensive as possible, and that actions and strategies identified were realistic and feasible. Possible general municipal and specific departmental actions have been included in Section 5 of this guide as part of the Sample Municipal Operational Plan.

Once the action list for each department has been formalized and adopted by staff, management and the smog alert response committee, the list can be made available to all staff. The City of Toronto post their divisional smog alert response actions and strategies on their intranet site, which is available to all municipal staff for easy reference. Some municipalities found they faced the challenge of buy-in from the departments, and that it usually took a couple of smog seasons before the smog plan caught on. A letter from the municipality's chief operating officer or department director endorsing the list of departmental actions will help reaffirm the municipality's commitment to smog reduction. In the City of Toronto, the Medical Officer of Health sent a memo to all Toronto Public Health managers and directors to remind their staff about the smog alert response actions for their division, as well as other relevant information such as the corporate notification protocol, educational resources available to staff, and contact information for the divisional representative. The memo was also made available for use as a template to all the other municipal divisions (refer to page 79 for a copy of the memo).

Staff Awareness

Keeping employees informed and providing regular reminders for all staff to do their part to help reduce harmful, smog-producing emissions is an important way to ensure the ongoing success of the smog response program. Posters, e-mail messages, screen savers, lobby displays, phone stickers, voice-mail reminders, newsletter articles, and regular updates at staff and departmental meetings can all help keep staff enthusiastic, aware and informed. For example, when a smog alert has been announced, the identifier "Smog Alert Day" is posted on the City of Mississauga's corporate intranet site with a link to a brief list of smog tips and the city's smog alert response plan. In addition to posting important smog information on their intranet site, the City of Burlington also posts signs on the doors of City Hall.


On Our Way To Clean Air
Turn Your Engine Off When Not In Use
Halton Partners For Clean Air

Halton Region anti-idling awareness campaign decal

There are many ideas for getting employees enthused about taking individual actions to reduce smog producing emissions. Special events, employee recognition days, smog buster awards and individual, departmental or office competitions are effective ways to encourage staff participation. For example, Halton Region organized a staff education and awareness campaign on anti-idling, which included an anti-idling awareness contest. Those people participating with decals on their cars were entered into a draw to win various prizes.

Many municipalities also take part in the Commuter Challenge organized nationally by Go for Green. Implemented as a friendly competition among Canadian cities, the Challenge tracks municipal reductions in energy consumption through the use of active and sustainable modes of transportation. Report cards are distributed to all staff members to record their method of travel to and from work for one week and prizes are awarded.

Emphasizing social responsibility and health issues – issues of greater importance to the general public – is also an effective tool for obtaining employee buy-in. Having the information come from the mayor or the local medical officer of health helps stress the importance of individual action on smog advisory days, as is the case with the City of Hamilton, where an e-mail is sent to every city employee on behalf of the Medical Officer of Health.

Effective awareness/outreach sessions help ensure that municipal employees recognize the importance of responding to a smog alert, and understand their respective roles. Employees need to understand that they can make a difference – at work and at home – during a smog alert and throughout the year. The objectives and actions of the program must be clearly understood by all staff.

The length and frequency of outreach sessions depend on the size of the municipality. Smaller municipalities may find that shorter sessions with handouts are more effective than longer more in-depth sessions and more feasible given the smaller number of employees. Larger municipalities, on the other hand, may find the opposite to be true. These sessions may also be used to encourage staff to contribute ideas, suggestions and assistance in implementing the program in their work places. It takes only a few people participating in car pools or bike-to-work days to get others motivated to do the same or discover their own unique ways of contributing. As well, giving employees an opportunity to contribute to the development of the program makes them more likely to embrace it, find solutions that work, and carry the positive actions and activities into their personal lives.

Evaluation Process and Revisiting the Smog Alert Response Plan

The development of a mechanism for evaluating the effectiveness of the smog alert response plan is very important. The evaluation process differs from municipality to municipality, with most using some form of questionnaire, which is sent out at the end of the traditional smog season to departmental leads and/or to key staff that implement the smog alert response actions. In previous years, the City of Hamilton compiled these questionnaires into a report which was then distributed to the department heads and the corporate management team. Amendments to the departmental operational procedures and actions were made based on the evaluation report.

The City of Markham established a comprehensive evaluation process by developing "indicators of success" and plan evaluation measures and evaluating the success of their smog response strategies after each smog alert. Markham's evaluation methods included:

- Surveying the municipal employees;
- Developing benchmarks or performance measures to determine whether the plan was implemented and to what degree (e.g., a questionnaire);
- Assessing barriers to the implementation of the plan;
- Measuring the impact of modifies activities on air quality; and
- Tracking the number of visits on their Web sites.

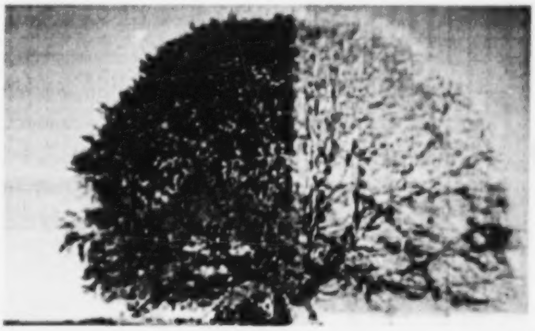
Halton Region uses many of the same "indicators of success," but they also include as part of their smog alert response plan evaluation criteria the number of private/other public sector organizations that have established smog response plans as a result of their lead.

LOCAL POOR AIR QUALITY

The provincial government will issue a smog advisory when there is a strong likelihood that widespread, elevated and persistent smog levels are expected the next day. If such conditions occur without warning and weather conditions conducive to elevated smog conditions are forecast to continue for six hours, then a smog advisory is issued immediately. It is possible, however, for poor air quality to exist locally and only for a short period of time (i.e., one or two hours). In these cases, the smog levels are not considered widespread or persistent, and a smog advisory would not be issued.

Some municipalities have expressed concerns about local poor air quality and are interested in exploring options and developing internal procedures for such occurrences. Others monitor the Air Quality Ontario Web site and track local air quality but do not implement their smog response plan unless a provincial advisory has been called. Municipalities may choose to implement their smog response plan or parts of the plan when local air quality is poor.

BEYOND THE TRADITIONAL SMOG SEASON



Although traditionally, smog tends to occur during the period between May and September, it is possible for smog advisories to be issued by the MOE outside this "traditional smog season." This is because of the introduction of $PM_{2.5}$, or particulate matter less than 2.5 microns in diameter, to the Air Quality Index in August 2002. The first advisory issued outside the traditional smog season was for October 10, 2003 for the Hamilton forecast region. In 2004, a smog advisory was again issued for the Hamilton forecast region for October 26 and 27. On February 4, 2005, a smog advisory was issued for 22 forecast regions across Ontario as a result of elevated $PM_{2.5}$ levels.

Generally, the activities included in the local smog response plans are related to maintenance during the summer months, such as grass cutting and pesticide use. However there are activities that can be implemented year-round as well as during October to April, the months outside the traditional smog season. For example:

- Implement an anti-idling policy and education/awareness campaign during the winter months as many motorists idle their cars in order to warm them up.
- Reduce single person vehicle use. Encourage the use of public transportation and car-pooling.
- Telecommute/teleconference – Allows for employees to work from home thereby eliminating vehicle emissions which would have otherwise been produced from the commute.
- Trip-chain – Group errands and tasks into one trip to maximize the efficiency of your vehicle.
- Implement a smart-burn program throughout the year. Discourage or implement a by-law, if feasible, restricting the use of wood stoves and fireplaces. Encourage, where possible, the use of natural gas and other clean fuels.

- Reduce energy consumption by:
  - Decreasing building heating system thermostats by 2 degrees in the evenings.
  - Opening all window coverings facing south or west on sunny days for all daylight hours
  - Closing window coverings in all rooms from dusk until dawn
  - Closing heat return vents and doors to any unused rooms
  - Turning off lights when not in use

  - Replacing incandescent lightbulbs with compact fluorescents
  - Turning off computers and monitors when not in use
  - Having facility cleaning staff work through a building one section/floor at a time to minimize lighting requirements as opposed to working several sections/floors at once ("block cleaning").
- Conduct energy audits to obtain information on the energy efficiency of municipal buildings and energy conservation projects the municipality could implement to increase the energy efficiency of their buildings.

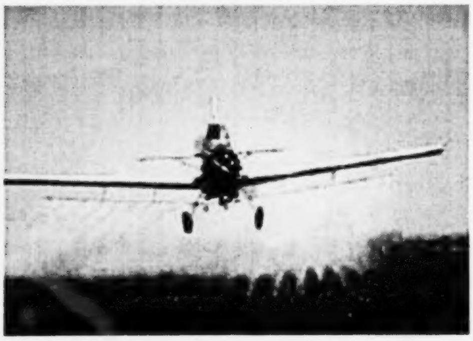
SECTION 2: EXPANDING PROGRAM SCOPE, INFLUENCE, AND IMPACT

THE LEGAL IMPETUS

The kinds of actions that are possible at the local level can have a significant positive impact on local and regional air quality. More and more municipalities are talking about the importance of by-laws in achieving targets and local lobbying by citizens and non-governmental organizations to set the bar higher to promote better air quality. Several municipalities have opted to implement regulatory policies (i.e., by-laws) over voluntary initiatives in order to increase participation.

Examples of by-laws that have a direct or indirect impact on smog include:

Open Air Burning – Many municipalities restrict open air burning unless permission has been obtained from the local fire chief. If a permit has been obtained, certain restrictions may still apply, such as the requirement that open air burnings only be conducted between the hours of 4 p.m. and midnight, except when the wind speed exceeds 15 kilometres per hour, during rainy or foggy weather, or at times when a smog alert has been declared, during which times, open air burning is strictly prohibited. In addition, actions may be required to ensure that any byproducts of open air burnings will not have a detrimental effect on the environment.



Pesticide Use – First implemented in Ontario by the City of Cobalt, this by-law is directed at the commercial use of pesticides. Enforcement of the by-law is however a significant challenge faced by municipalities.

Anti-Idling – This by-law prevents vehicle operators from leaving their vehicle idling for more than a specified amount of time. In London, which implemented an anti-idling by-law in November 1999, vehicles are not to be left idling for more than five minutes. Others, such as the City of Toronto, have a limit of three minutes and are considering reducing this limit further.

The development and approval process for by-laws will most likely differ between municipalities. The Town of East Gwillimbury, for example, has a very straight-forward by-law process:

1. Council or the public recommends the by-law
2. The by-law is drafted
    - Notice and public information
    - Other agencies may be consulted
3. A Public meeting is held
4. Council passes or refuses to pass the by-law
5. If by-law is passed, council sends notice of passage. If no one appeals, the by-law is effective as of the date the council passed the by-law.

The City of London's anti-idling by-law followed a similar process. A city councillor worked with the local health unit to determine the feasibility of an air quality policy in London and to discuss possible initiatives, such as implementing an anti-idling by-law. The councillor then proposed the anti-idling by-law to City Council, where it was referred to the Advisory Committee on the Environment (ACE) for review. Extensive research was conducted by the ACE and various sources were consulted on vehicle idling, the impacts of vehicle idling, and current policies and practices in idling-control underway in other jurisdictions. Supported by the local health unit, City Council passed the anti-idling by-law in August 1999, and it came into effect in November of the same year.

Like the pesticide by-law, enforcement is one of the main challenges faced by municipalities enacting an anti-idling by-law. In Toronto, by-law enforcement officers are responsible for enforcing the anti-idling by-law, while in London, the public health inspectors from the Middlesex-London Health Unit are responsible for both implementation and enforcement. The Burlington by-law is being enforced by parking enforcement officers who also issue an "informational ticket" with the actual ticket which provides information on the by-law and the myths and realities of idling (refer to page 88 for a copy of the Informational Ticket).

Just as there may be actions/circumstances that move the development and implementation of a by-law forward, municipalities may also face barriers to the successful implementation of a by-law, including a lack of empirical evidence to support/justify the actions required and skepticism regarding the by-law's impact being worth the resources expended.

Rather than "reinventing the wheel" or starting from scratch, municipalities should look to other municipalities who have already implemented similar initiatives. Just as London looked to Toronto, Montreal and Caledon for assistance, others can turn to the City of London for guidance. (Refer to page 70 for examples of factors contributing to the development of the City of London's anti-idling by-law, lessons learned, and a copy of the by-law).

COMMUNITY OUTREACH AND EDUCATION

Municipal governments can have a significant influence on residents and other employers, agencies and organizations in the community. Their ability to inspire, challenge and encourage others to higher standards should not be underestimated. Local leadership on smog action can also have an influence on other levels of government, pushing them to take stronger preventative measures. While the internal processes discussed earlier are essential in the beginning phases, once underway it is important that municipalities consider external stakeholders and strategies to keep their plan alive and evolving.

External Notification Process

A smog alert is designed to give all residents in the affected areas advance warning of impending air pollution levels that could pose a risk to their health. Most municipalities agree on the importance of notifying local health care facilities, schools and educational facilities, industrial and commercial operations, and individual residents about the practical actions that they need to take during the alert. However, many municipalities have yet to develop and implement a clear communications plan for external stakeholders.

There are three main reasons for developing an external smog alert notification process:

1. To provide advance warning to as many members of the public as possible in the affected area so that they can take appropriate action to protect their health and the health of their families;
2. To encourage the owners or operators of local pollution sources (from large industries to private and commercial vehicles to lawn mowers and barbecues) to reduce the release of smog-related emissions that can make local problems worse; and
3. To position the municipality and the local Ministry of the Environment office as reputable sources of additional information on smog problems and related environmental and health issues.

Municipalities are currently using a variety of strategies and mechanisms to notify the community and specific stakeholder groups when an advisory has been called. A number of municipalities have clear communications plans for external stakeholders, including the cities of Mississauga, Hamilton, and Windsor, the regions of Peel and Waterloo, Essex County, and the Town of Markham. These communication plans often have a number of elements in common and may include the notification of a list of key businesses, institutions, and the public via e-mail; media releases; pre-recorded voice-mail messages; and the preparation and distribution of informational material such as brochures, fact sheets, news articles, and posters that outline key smog messages (i.e., what is smog?, health effects, etc.). (Refer to page 82 for the City of Mississauga's communications plan).

Some municipalities post information on their Web sites. For example, both Peel Region and Toronto Public Health post flashing bulletins on their internet and intranet homepages when smog advisories are called. Others post notices in relevant municipal buildings such as the public health office.

Municipalities might also consider contacting local groups, facilities, and organizations directly with relevant information, such as the expected duration of the smog advisory, potential adverse health effects, and recommended actions to minimize exposure to smog. The Windsor-Essex County Environmental Committee, for example, hired a coordinator to send smog advisories to schools, daycares, industries, and the general public.

The specific list of community contacts will vary, but overall municipalities contact the following groups, facilities, and organizations:

- **Local media** – including radio, television, and daily press outlets;
- **Local health care community** – including public and general hospitals, chronic care hospitals, mental health facilities, nursing homes, homes for the aged, walk-in clinics, and any other health care facilities offering emergency care;
- **Area municipalities and recreational facilities** that may have staff and clients working or playing outdoors;
- **Local educational community** – including public and private institutions, such as elementary, secondary and vocational schools, training academies, post-secondary colleges and universities, company training centres, summer schools and camps, day-care centres, and local health organizations;
- **Other institutions** – such as correctional facilities and shelters;
- **Local industries and commercial organizations** – including coal- or oil-fired electricity generating facilities, other coal- or oil-fired process, steam generating facilities, incinerators, manufacturing industries, petroleum refining operations, chemical industries, primary metals industries, mineral processing industries, the grain industry, glass industries, and the paper and allied products sector; and
- **Local transportation sector** – including public transit authorities, delivery and cartage services, trucking fleets, taxis and livery operations, garbage and recyclables collection, emergency vehicle services, and auto body repair and painting shops.

To identify these community contacts, municipalities can use available directories, municipal records and other resources. For example, within their smog alert response plan, the Region of Waterloo Public Health developed a database of 300 organizations that work with or are in contact with groups that are sensitive to air quality, such as seniors, children, and those with respiratory problems. The region instructs these organizations on how to sign up to the Ministry of the Environment's e-mail notification system and provides them with the appropriate health protection information.

Municipalities can also work with local media to promote air quality event information directly into the newsroom. Ontario Lung Association research shows that news wires are the main source of information for news and weather reporting. Local partnerships with the media can help ensure that the public are receiving accurate, relevant air quality information and that local events receive adequate coverage. Providing local media with information that helps the broadcaster make the air quality forecast relevant, such as news pegs, fact sheets, and prepared animations/graphics is important. For example, during prolonged periods of smog, Lambton sends relevant information to the media about how the public can protect themselves, and what they can do locally to reduce their emissions that cause air pollution. For tips and actions that can be implemented at the community level, refer to the Ministry of the Environment's Air Quality Ontario site: www.airqualityontario.com

The Evolving Role of the Smog Alert Response Steering Committee

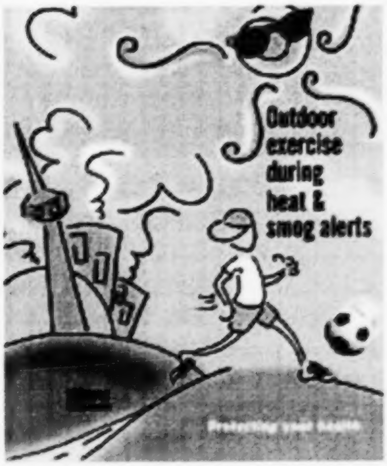
Whether called departmental, corporate, or environmental advisory, steering committees often have a role in the development of the municipal smog alert response plan. After completion of the plan, the steering committee could shift into more of a general forum for addressing the smog related concerns of municipal departments, citizens and local businesses, for the periodic review of the plan, and/or for the implementation and enforcement of smog reducing policies. In Peel Region, the Clean Air Champion departmental committee began working on improving the effectiveness of their smog plan by regularly reviewing and evaluating their procedures and by sharing best practices.

Some municipalities have also opened their committee to members other than departmental representatives. For example, the Region of Waterloo's multi-stakeholder committee includes representatives from public health, the Ontario Lung Association, the University of Waterloo, area municipalities, local environmental groups and members of the general public. The Windsor Essex County Environmental Committee (WECEC) consists of representatives from a local union's environmental committee, the industry sector, the local commerce community, environmental non-governmental organizations (ENGOs), a professor from the University of Windsor and members of the public.

In 2003, the Halton Partners for Clean Air reviewed their program and accomplishments in order to set priorities on future directions. They determined that in order to ensure the partnership's continuing influence, leadership needed to be expanded beyond the public sector. Since then, the Committee has been acting on a strategy to broaden its mandate to include roles for industry, community/consumer groups, the Ministry of Environment and the Ministry of Natural Resources.

The complexity of the issues addressed by the Steering Committee often changes over time. While initially the focus of the steering committee may revolve around more basic projects (such as the development of smog response policies and evaluating the plans) many committees have also begun looking at implementing more elaborate community programs. For instance, the WECEC drafted, proposed and obtained city council approval for an anti-idling by-law and pesticide use policies. In addition the Committee has developed a television program on environmental issues that airs on the local cable channel. The Committee also held an Air Quality Symposium, and an 11 year old member obtained funding from Environment Canada to prepare and distribute a newsletter on smog to every student in the County. Clean Air Hamilton has played an active role in community emission reduction initiatives such as tree planting, green fleet policies, and the promotion of the Commuter Challenge. They have also conducted studies on emissions trading and local truck emissions, hosted three Upwind-Downwind Conferences, and prepared a report on the health impacts of poor local air quality.

Public Education: Information Packages and Promotional Materials



Promoting public awareness about smog is an important step towards the bigger picture. Educating the public about the causes and adverse effects of smog increases the likelihood that they will take actions to protect themselves and improve local air quality.

Municipalities have taken many different approaches to public education and awareness. Fact sheets and brochures with general smog information are made available to the public in the City of Hamilton, Lambton County, and the City of Toronto. Both Waterloo and York Regions send information packages to local childcare facilities including daycares, school boards, and community centres. The Region of Waterloo sends customized information kits to hospitals and long-term care facilities, social service agencies, local universities and colleges, and area municipalities.

In 2004, a research company, Environics Research Group, conducted a national telephone survey on the public's understanding of air quality issues. They found that people generally associated air pollution with vehicular and industrial emissions and would judge air quality based on sight and smell. Also, despite existing messaging and outreach programs, common perception, regardless of education level, was that one could protect oneself from ground-level ozone by avoiding the sun and escape air pollution by leaving the city. In addition, while many recognized the potential impacts of air pollution on respiratory illness, there was little to no knowledge regarding particulate matter and cardiovascular impacts.

The results of a local survey previously conducted by the County of Lambton Community Health Services Department were similar to those of the national survey, with many residents concerned about, but having little knowledge of the health and environmental impacts of air pollution. In addition, many residents over-estimated the relative contribution of industrial emissions and under-estimated the public's role in local, regional and global air problems. In response to their local survey, the County of Lambton Community Health Services Department developed a community air quality action project in partnership with Environment Canada. The awareness programs worked to change public misconceptions regarding the anthropogenic sources of smog and the importance of individual responsibility in taking action. The project promoted and supported initiatives which reduce greenhouse gas emissions, such as improved transportation practices (like the use of public transit, non-motorized modes of transport and car-pooling) and energy conservation initiatives.

In order to achieve maximum public participation, an education program might consider addressing barriers to behaviour change. This requires the program to be positive and encourage individuals to take actions that, cumulatively, have a significant impact on air quality. Successful programs generally have a slogan or acronym that emphasizes the positive contributions individuals can make, rather than discouraging them through negative messages.

In addition to public education, some municipalities have or are developing curricula to reach elementary and secondary students. (Refer to page 85 for an example of an educational program developed by Waterloo Region). The development of smog response guidelines and initiatives by schools and school boards is important, as many students are attending school at the beginning or end of the traditional smog season (May, June and September). Furthermore, with the inclusion of $PM_{2.5}$ into the Air Quality Index, the possibility exists of smog alert days occurring beyond the traditional smog season, as was the case for Hamilton where a smog advisory was issued in October of 2003 and 2004.

STRENGTHENING PARTNERSHIPS – POOLING RESOURCES

Partnerships enable municipalities to do more with less. Developing and strengthening partnerships with the different levels of government and other stakeholders enables municipalities to have greater impact and visibility, increase the reach and frequency of their initiatives, pool staff, financial resources and knowledge and eliminate duplication. The keys to success in effective partnerships include well-defined vision and mission, clear expectations, identifiable benefits, good communication and recognition and appreciation. Outlined in the following paragraphs are some joint initiatives between different levels of government, municipal organizations and other stakeholders dedicated to collectively tackling air quality related issues.

Federal, Provincial and Municipal Partnerships

A number of municipalities are involved in national and provincial programs to address climate change and air quality. For example, twenty-six Ontario municipalities are members of the Partners for Climate Protection (PCP) program in association with the Federation of Canadian Municipalities (FCM) and the International Council for Local Environmental Initiatives (ICLEI). Participating municipalities complete an inventory of energy use and emissions and forecast energy use and emissions for the next 10-20 years using PCP software. Once completed municipalities are supported to set emission reduction targets, develop and implement a local action plan and monitor and report on progress. The federal government provides financial support to PCP for projects designed to develop technologies to mitigate greenhouse gas emissions through their Climate Change Action Plan.

The Federation of Canadian Municipalities (FCM) has long been recognized as an important national voice for municipal governments often representing their interests on policy and program matters within federal jurisdiction. Members include Canada's largest cities, small urban and rural communities and the 17 major provincial and territorial municipal associations. Municipal leaders from all parts of Canada assemble annually to establish FCM policy on key issues. The National Board of Directors meets quarterly to review policy and program matters.

Through $125 million in funding from the federal government, the FCM has established two complementary 'Green Municipal Funds' to support municipal government actions to cut pollution, reduce greenhouse gas emissions, and improve quality of life:

- **The Green Municipal Enabling Fund (GMEF).** A five-year, $25-million fund that provide grants for energy audits and feasibility studies on projects designed to improve the quality of air, water and soil through greater energy efficiency, the sustainable use of renewable and non-renewable resources and more efficient water, waste and wastewater management; and
- **The Green Municipal Investment Fund (GMIF).** A $100-million, permanent revolving fund that provides loans to municipalities to finance environmental infrastructure projects at competitive rates that help municipalities finance 15 to 25 per cent of capital costs. This Fund also provides up to $2 million a year in pilot project grants for initiatives that could be replicated in communities across the country.

In addition to national organizations like the FCM, there are a number of provincial, regional and local municipal organizations actively promoting the sharing of information, the pooling of financial and other resources and the development of regional and issue-focused partnerships.

A non-profit organization, the Association of Municipalities of Ontario (AMO) offers a variety of services and products to its member municipalities, which represent approximately 95 per cent of the population of Ontario. The mandate of the organization is to "support and enhance strong and effective municipal government in Ontario." AMO develops policy positions and reports on issues of general interest to municipal governments. It also conducts ongoing liaison with provincial government and other stakeholders; informs and educates governments, the media and the public on municipal issues; markets beneficial services to the municipal sector and maintains a resources centre on issues of municipal interest. Policy research and analysis for the Association are primarily conducted by a team of policy advisors and task forces generally develop and recommend courses of action to the Board of Directors.

A Local Authority Service (LAS) was created in 1992 by AMO to help municipalities reduce the cost of common expenditures as well as to increase revenues. The ONE Funds investment program, jointly run with the CHUMS Financing Corp., offers a diversified way for municipalities to invest surplus funds and reserves. In 2003, the Local Authority Service not only provided a wide range of value-added services to local government, but also helped fund the work of AMO by nearly $200,000.

Some municipalities have looked internally for funding. The Town of Newmarket sets aside one per cent of their budget for the acquisition of natural lands. The City of Toronto set up the Toronto Atmospheric Fund to assist with the implementation of environmental initiatives. Outside foundations may also provide financial assistance according to specific criteria. For example, the Ontario Trillium Foundation also has grants available for rural and small municipalities with population of 20,000 or less.

The Greater Toronto Area Clean Air Council (GTA-CAC) is an inter-governmental working group that promotes increased awareness of regional air quality issues and the reduction of air pollution emissions in the Greater Toronto Area through the collective efforts of all levels of government. Members include all levels of government in the Greater Toronto Area and beyond.

GTA CleanAir COUNCIL

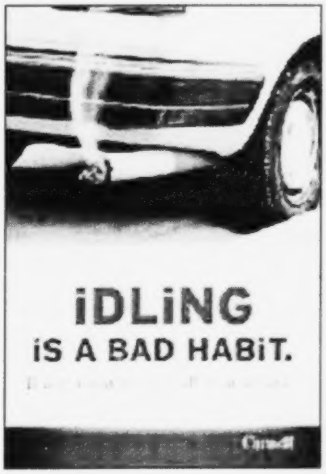
The GTA Clean Air Council invites orders of government in the GTA as well as governments and organizations within the airshed to participate in activities of the Council. Members of the GTA-CAC include Environment Canada, Health Canada, Natural Resources Canada and Transport Canada, the Ontario Ministries of the Environment and Transportation, the regions of Durham, Halton, Peel and York, the cities of Brampton, Burlington, Mississauga, Oshawa, Pickering, Toronto, and Vaughan, the towns of Ajax, Caledon, Markham, Newmarket, Oakville, Richmond Hill and Whitby, the Municipality of Clarington and Township of King. Participation also includes the Toronto Atmospheric Fund and as associate members Clean Air Hamilton, the Regional Municipality of Waterloo and the Toronto and Region Conservation Authority.

Each year in June, members come together in the annual Smog Summit hosted by the Clean Air Partnership and the City of Toronto, a meeting where politicians from the GTA make clean air announcements and renew their commitment to taking action to improve air quality in the coming year.

Regional partnerships also exist which can have significant impact. For example, Halton Region, in addition to participating in the regional GTA-CAC has created its own local inter-governmental committee. The Halton Partners for Clean Air is a consortium of 12 public sector organizations: Halton Region, the City of Burlington, and the Towns of Milton, Halton Hills, and Oakville, as well as the Halton District School Board, the Halton District Catholic School Board, Conservation Halton, Halton Hills Hydro, Burlington Hydro, Milton Hydro, and Oakville Hydro.

The partners are dedicated to improving air quality within the Region of Halton and are committed to encouraging other stakeholders in our community to take similar action. Over the course of the last four years, the Halton Partners for Clean Air has been taking a number of actions to address the growing concern regarding the health and environmental impact of smog. Some of these activities include:

- Promoting public awareness of the impact of smog on public health through brochures, Web sites, displays and community events;
- Working with all members of the partnership to support community education initiatives regarding Clean Air (i.e., Idling Reduction Policies and Education); and
- Expanding its mandate to include industry groups and consumer groups.



Another noteworthy example pertains to the Region of Niagara. In May 2004, the Region held a one-day symposium involving municipalities and other stakeholders to brainstorm on a smog alert response plan for the region due to growing concerns and evidence of significant public health impacts of poor air quality. At the request of a number of the municipalities, the Regional Niagara Public Health Department is taking the lead on a region-wide smog alert response plan that can be used by the municipalities and local organizations in the development of their own action plans.

Successful initiatives sometimes involve all levels of government, and the pooling of knowledge and resources through specific projects or campaigns. The Idle-Free campaign spearheaded by Natural Resources Canada (NRCAN) is an example in point. The campaign, which began in 2001, emphasized working with local municipalities on anti-idling campaigns which make a difference. The program focused on providing municipalities with free anti-idling promotional materials (available on the NRCAN Web site), a newsletter to update progress across the country, information and support for the development of local campaigns and funding for specific campaigns to get underway. The results have been impressive. Campaigns have been run in Sudbury and Mississauga with a 36 and 46 per cent reduction in idling frequency at the schools and six other campaigns have been supported across the country. NRCAN is now working with partners to expand their program in other municipalities and to examine lessons learned on what exists and is effective from the social marketing perspective.

Partnering with the Health Community

Partnering with the health community can increase the reach and impact of municipal programs. The medical community has the financial resources and already recognizes the detrimental impact of smog on human health. Health sells and partnering with the medical community may lend greater credibility to the importance of municipal air quality initiatives. A range of health care professionals may be interested in promoting educational programs or materials relating to air quality and health including, family doctors, internal medicine specialists, cardiologists, allergists, professionals working in the fields of geriatrics, or pediatrics and the marketing departments of local hospitals.

Medical Officers of Health and Local Health Units

As credible professionals with substantial access to the media, local Ontario Medical Officers of Health (MOHs) are well positioned to disseminate essential information on the potential health risks associated with poor air quality. MOHs also have considerable influence on public opinion and can encourage behavioural changes by supporting the development and implementation of social marketing programs. In addition, MOHs have a mandated responsibility to take preventative measures to protect public health and can therefore propose possible corporate and municipal policies to reduce local emissions.

The MOHs in several municipalities have taken the lead in terms of smog response. In York Region, for example, smog alert response activities are administered by the Health Services Department, and in the City of Ottawa, the notification of smog advisories and the dissemination of smog and health related information comes directly from the MOH.

The Ministry of the Environment in collaboration with the Ministry of Health and Long-Term Care has developed air quality and health fact sheets that have been disseminated to 37 local public health units. The ministries are also looking to distribute the fact sheets to hospitals and emergency rooms. The fact sheets can also be made available for interested municipalities.

Partnering with Not for Profit Organizations, Associations and other Stakeholders

At the community level the links are close between cause and effect, ideas and action. Community based groups can have a significant impact on local air quality issues by engaging people and ideas, raising knowledge and awareness and lobbying government officials to take further action.

There are a number of Not-for-Profit Organizations directly concerned with air quality and smog issues. For example:

- **Friends of the Earth** is working with Ottawa on the implementation of an anti-idling campaign in the public school system;
- **The Toronto Environmental Alliance** has participated in various conferences, including the Public Education and Outreach Issue Table of the Climate Change Strategy and the Pollution-Prevention Program for Hospitals;
- **EcoPerth** developed the ecoRide program, an internet bulletin board which enables individuals to post/contact others in the municipality looking for/offering rides to Ottawa and the surrounding area;
- **Green Venture** as a member of Clean Air Hamilton assists with local efforts to improve Hamilton's air quality; and
- **Peterborough Green-Up** partnered with the City of Peterborough to conduct energy audits of local community households.

Local environmental initiatives are advancing in Ontario. Since 1991, the Green Communities Association in Ontario has been promoting household and community action that can be taken to achieve environmental sustainability including clean air. There are approximately 12 GCA Members in Ontario and 12 Associate Members. These members, including Eco-Action Sudbury, EcoSuperior in Thunder Bay, Green Nipissing, North Toronto Green Community, and the Windfall Ecology Centre in Newmarket are community-based, non-profit, multi-partner environmental organizations which focus on local action.

Air quality information is also important from the perspective of a number of industry groups who depend upon good air quality and weather for their livelihood. For example, the recreation, tourism and sports-related industries are highly dependent on weather and may be interested in working with municipal officials to promote the importance of good air quality. Furthermore, different sectors such as the transit authorities may be interested in developing partnerships that are mutually beneficial. For example, the City of Markham has been involved with the Black Creek Regional Transportation Management Association to address local transportation problems.

REDUCING LOCAL EMISSIONS

Municipalities have both voluntary and formal programs for getting industries to cut back emissions. For example, some municipalities have by-laws such as pesticides, anti-idling and sewer use by-laws, that impact industry. Other municipalities, such as Hamilton and Lambton County have established formal voluntary industrial self-monitoring programs. The Hamilton monitoring network involves some 22 industries including Stelco and Dofasco. The Lambton Industrial Monitoring Society involves eight chemical companies who do the monitoring, modelling and reporting of data. For example, if SO_2 levels are too high in Sarnia, a message is sent out by the Lambton Industrial Monitoring Society to the companies who in turn attempt to reduce emissions.

Other regions/municipalities are involving or planning to involve industry and other private sector organizations in their smog alert response or clean air committees. For example, the Halton Partners for Clean Air has expanded to include representatives from Mattamy Homes Ltd., Umicore Autocat Canada, as well as the hydro utility corporations of Burlington, Halton Hills, Milton, and Oakville. Hamilton Hydro has departmental operation procedures which are outlined in the Hamilton Smog Response Plan. The Windsor-Essex County Environmental Committee has representatives from the industrial sector including Ford and BASF. York Region is forming a corporate clean air task force, involving external partners, that will be mandated to identify, develop and recommend department-specific Corporate Clean Air Actions and to incorporate these actions into a comprehensive Regional Air Quality Policy. Markham sends a letter to contractors/ suppliers throughout the city asking them to limit emissions when a smog advisory has been called. Enbridge and Home Depot (Clean Air Foundation) participate in the Greater Toronto Area 20/20 program to encourage home owners to reduce energy use at home and on the road.

THE IMPORTANCE OF RESEARCH

Effective smog alert response plans are grounded in the availability of accurate and up-to-date scientific information about the local and transboundary sources of smog emissions and their interactions in the atmosphere and with weather, and our knowledge of the environmental and health effects associated with these emissions. In recent years, the Ministry of the Environment has modified the Air Quality Index and smog advisory program to include fine particulate matter, $PM_{2.5}$. Scientific research into the components of smog is however an ongoing process, with interest now in the characterization and composition of particles.

Other research studies are also underway to explore the inflow and outflow patterns of air pollution across nations. For example, in one study involving 500 scientists from Canada, the U.S. and Europe, episodes of high levels of ground-level ozone in Europe on a number of occasions were being traced back to North America. Further scientific research is required to develop a better understanding of both local air quality issues as well as the impact of transboundary and transcontinental emissions.

Air health effects research is also important in relation to acute health effects (population based epidemiology; field epidemiology and toxicology) as well as chronic health effects (population based studies and field studies). The federal government in consultation with the province and specific municipalities is undertaking a number of air health effects studies in the Great Lakes Basin area. Health Canada is also leading a Canada-U.S. Border Air Quality Strategy (BAQS) including a prospective Children's respiratory health study in Windsor. Other municipalities are undertaking their own research. The Region of Waterloo, for instance, is exploring the increased exposure risk of living, working or exercising in close proximity to major transportation corridors and highways. Under the auspices of the Centre for Urban Health Initiatives, Toronto Public Health is participating in the development of a research project that will examine the respiratory health impacts associated with two risk factors: traffic intensity and socio-economic status.

Some municipalities are undertaking their own research in collaboration with other partners. For example, the City of London conducted a study on air emissions in order to provide an overview of local air quality and to establish baseline information on energy use and greenhouse gas emissions within the city.

Despite some preliminary investments made towards the development of emission reduction models and comprehensive emission inventories, there are still gaps in our knowledge of local emission sources and the effectiveness of local emission reduction strategies. Municipalities that share a regional airshed may find that sharing resources and working collaboratively on further research would be an effective method of moving forward in this field. Efforts are also needed in the area of social marketing to understand how to effectively impact and change behaviour. National and regional approaches to air quality messaging are important to ensure consistent messaging which is not confusing to the public. The federal government is currently leading a process involving workshops, electronic surveys and focus groups to help all levels of government better define this messaging as part of their interest in moving towards a national health-based air quality index. Further research on the effectiveness of existing and proposed messaging is required.

LINKAGES WITH OTHER MUNICIPAL PRIORITIES

Greening Communities

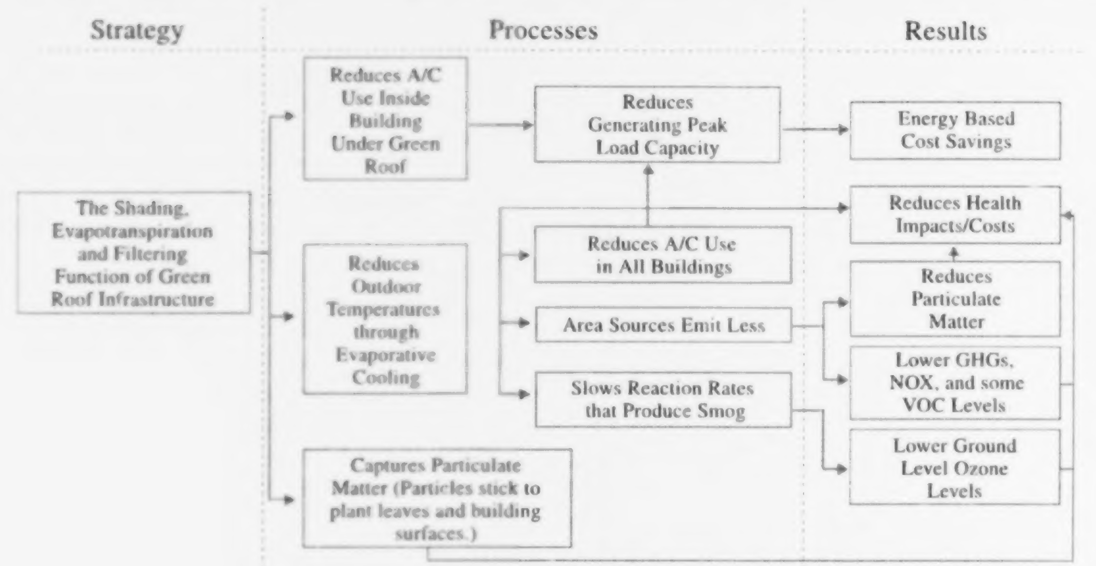
'Greening' a community has several benefits aside from being aesthetically pleasing, including improving air quality by absorbing carbon dioxide gases and blocking harmful pollution causing particles, and cooling the air temperature by providing shade from the sun. Through the use of options such as urban forestry, planting trees and shrubs, and creating greenbelts along the outskirts of urban areas, municipalities can also reduce the "urban heat island effect." The urban heat island effect tends to occur during the summer months in the downtown core of municipalities as the expanse of asphalt, buildings and other developments absorb solar radiation and re-radiate it as heat. As a result urban centres experience warmer temperatures than the surrounding areas.

Waterloo City Hall Demonstration Green-Roof

Green Roofs

More and more municipalities are recognizing the benefits of greening their community. Some municipalities, such as the City of Toronto, the City of Waterloo, and the Town of Markham have recommended to their city councils the inclusion of green roofs on municipal buildings. Created through the use of waterproofing, growing materials, and drainage systems, green roofs have numerous public and private benefits, including reducing the energy required to heat and cool buildings, improving air quality, and reducing the urban heat island effect. Green roofs also filter the air moving across it thereby improving local air quality. According to Green Roofs for Healthy Cities, a network of public and private organizations that assist in the development of green roofs, 1.0 m^2 of grass on a rooftop can remove 0.2 kg of airborne particulates from the air every year.

The following diagram illustrates how green roofs reduce the urban heat island effect and improve air quality.



Green Roofs & Urban Heat Island/Air Quality Benefits

Strategy
Processes
Results
The Shading, Evapotranspiration and Filtering Function of Green Roof Infrastructure
Reduces A/C Use Inside Building Under Green Roof
Reduces Outdoor Temperatures through Evaporative Cooling
Captures Particulate Matter (Particles stick to plant leaves and building surfaces.)
Reduces Generating Peak Load Capacity
Reduces A/C Use in All Buildings
Area Sources Emit Less
Slows Reaction Rates that Produce Smog
Energy Based Cost Savings
Reduces Health Impacts/Costs
Reduces Particulate Matter
Lower GHGs, NOX, and some VOC Levels
Lower Ground Level Ozone Levels

Source: Green Roofs for Healthy Cities

Despite the many public benefits of green roofs, many municipalities across North America have yet to develop comprehensive policy support for green roofs. The widespread development of green roofs is more evident in locations where sophisticated public policy support exists, such as in Germany, where approximately 43 per cent of cities have implemented green roof policies and programs, both financial and regulatory, and over 10 per cent of flat-roofed buildings have established green roofs.

Pesticide Use

At the 2004 GTA-CAC Smog Summit, many municipalities focused on pesticide reduction as a means to curb smog. While an important municipal initiative, the relationship between pesticides and smog is complex and dependent upon factors such as the volatility of chemicals sprayed and air flow patterns. Pesticides contain volatile organic compounds (VOCs). When these VOCs are released into the air during the application process, they react with nitrogen oxides (NO_X) to produce ground-level ozone. Ground level ozone combined with particulate matter and other gases already in the atmosphere creates smog. However, even pesticides that are not immediately airborne, such as those applied directly to bodies of water for weed control, or indirectly as a result of soil runoff, can contribute to poor air quality through evaporation. Depending on the volatility (evaporation ability) of a particular pesticide, VOCs will once again find their way into the atmosphere and negatively impact local air quality. However, due to difficulties predicting with accuracy to what extent the release of pesticides into the atmosphere will affect the environment, it is probably prudent to minimize the unnecessary release of pesticides in order to reduce the potential health impacts.

In addition to the indirect health effects, pesticides can potentially cause as a result of the release of VOCs into the air, pesticides can directly put children, adults and even pets at risk through exposure to dangerous chemicals during the application of pesticides and/or after they have entered the environment.

In addition to implementing awareness programs, municipalities can control the terms of their contracts. Halton Region incorporated a "no pesticide" clause into their lawn maintenance contract (refer to page 67 for an example of this "no pesticide" clause in the ground maintenance contract). This clause restricts the use of pesticides completely to control weeds on hard surfaces and requires regional consent prior to the use of pesticides in all other cases. Contractors are encouraged to use alternatives to pesticides to the fullest extent possible.

While several municipalities have focused their effort on promoting voluntary pesticide reducing action, some, including the Towns of Caledon, Perth, and Cobalt, and the City of Toronto have enacted pesticide by-laws, which restrict the commercial use of pesticides within the municipality.

Energy Conservation

The majority of air pollution results from the production and use of fossil fuels. Greenhouse gases, and other toxic pollutants are released into the atmosphere through the combustion of fossil fuels required to power vehicles, produce electricity, heat homes, and create mechanical energy and heat for industrial uses.

Individuals, industries and governments in Ontario have all begun to actively address efforts to reduce energy consumption. Ontario households can improve the energy efficiency of their homes and make appropriate, informed choices when selecting appliances and automobiles. Companies are beginning to invest resources into the development of new fuels and new technology that will effectively reduce their greenhouse gas emissions. The provincial governments have invested in alternative energy sources and implemented initiatives that promote energy efficiency. Municipalities are developing and implementing initiatives aimed at reducing energy consumption and decreasing greenhouse gas emissions such as using renewable energy resources, retrofitting buildings, and encouraging the use of alternative transportation.

In an effort to make a difference, some Ontario municipalities have enlisted the help of external consultants to perform energy audits on municipal buildings and facilities. Energy service companies specialize in the implementation of energy management initiatives. They are often a viable solution for municipalities with limited financial resources looking to reduce energy costs and improve energy efficiency in municipal facilities since their earnings usually correspond to the amount of energy saved from a retrofit project. An energy audit, conducted by the municipality or energy services company will recommend changes that can be made that will reduce energy consumption by varying degrees. The municipality can then perform cost-savings analysis of each potential initiative to determine feasibility, long-term savings, emission reduction potential and balance the costs and resource implications of the changes with potential savings.

Land-Use Planning

According to the Prime Minister's Caucus Task Force on Urban Issues in their 2002 report on Canada's urban strategy, more than half of all Canadians live in just four urban centres. As cities become more populated and the demand for housing increases, the boundaries of the city begin to spread out or "sprawl." As more and more people make the choice to live outside the "big city" while still having access for shopping and entertainment, the number of suburban housing subdivisions increases substantially. Urban sprawl causes highways and roads to become clogged with traffic, resulting in increases in pollution and energy consumption.

Over the last decade, municipalities have been reconsidering the suburban form of residential development. Municipalities have a range of land-use planning powers and tools to encourage compact, energy-efficient urban form, including official plans, zoning by-laws, subdivision control, and site plans. In a number of municipalities new developments and regional plans are now being considered based on the concept of compact urban form – a higher density form of development with a mix of uses and planned linkages between transportation modes such as transit, cycling and pedestrian walkways. This form of development is considered more energy efficient. Transit services can be provided more readily and reliance on the automobile decreases.

Transportation Demand Management

Transportation Demand Management (TDM) is a general term for initiatives that encourage a reduction in single occupancy vehicle trips and an increased demand for existing transportation systems and strategies that result in the more efficient use of transportation resources. Such actions could include the promotion of ride-sharing and transit use through public education and awareness programs, the establishment of zoning policies that encourage mixed-use development, the creation of park-and-ride facilities, and the availability of disincentives for driving and incentives for carpooling.

Enhancements a municipality may wish to explore include:

- **Establishing high-occupancy vehicle (HOV)** lanes that are restricted completely or during specified times to transit vehicles, which would reduce transit travel time and increase passenger confidence in the transit system, thus encouraging increased transit use. A municipality could use existing lanes by marking them with "diamonds" and signage, or they may choose to widen roads to accommodate the inclusion of these lanes.
- **Queue-jump lanes for transit vehicles** which are shorter versions of HOV lanes located at intersections to enable transit vehicles to by-pass any back-up of other vehicles at these intersections.
- **Stopping, turning and parking restrictions** could help to eliminate the interferences transit buses often encounter during their operation. Municipalities have the ability to enact by-laws to restrict such actions, especially during peak traffic hours.
- **Transit Malls**, which are designated areas where transit vehicles are the exclusive or dominant form of transportation.
- **Increased parking spaces at transit junctions**, which will enable people to park-and-ride public transportation.
- **Increased parking fees in municipal lots** or the elimination of free parking in areas that are well-served by transit.
- **Cost incentives to target groups**, such as discounted monthly passes for daily commuters and discounted fares for municipal employees and students, can result in increased ridership.
- **Transfers between transit modes** and systems.
- **Implementing options to "green" municipal fleets** such as using biodiesel fuel.

Biodiesel is a clean, renewable diesel fuel substitute produced from agricultural resources such as soybeans, rapeseed (canola), or even recycled cooking oil from restaurants. It can be burned in any standard, unmodified diesel engine either in its pure form or blended with traditional diesel fuel. The main benefits of biodiesel are improved air quality (particularly lower sulphur emissions than from fossil fuels), increased energy self-sufficiency for importing countries, and increased demand for domestic agricultural products. Exhaust emission improvements include substantial reductions in carbon monoxide, hydrocarbons and particulates, although the production of nitrogen gases is similar to regular diesel fuel.

Climate Change and Alternative Energy

Climate change is a global problem, affecting all countries. While some greenhouse gases (GHGs) form naturally, many human activities add additional GHGs to the atmosphere through the heating and cooling of buildings, the extensive use of energy at home and work, the use of vehicles, and the powering industrial processes.

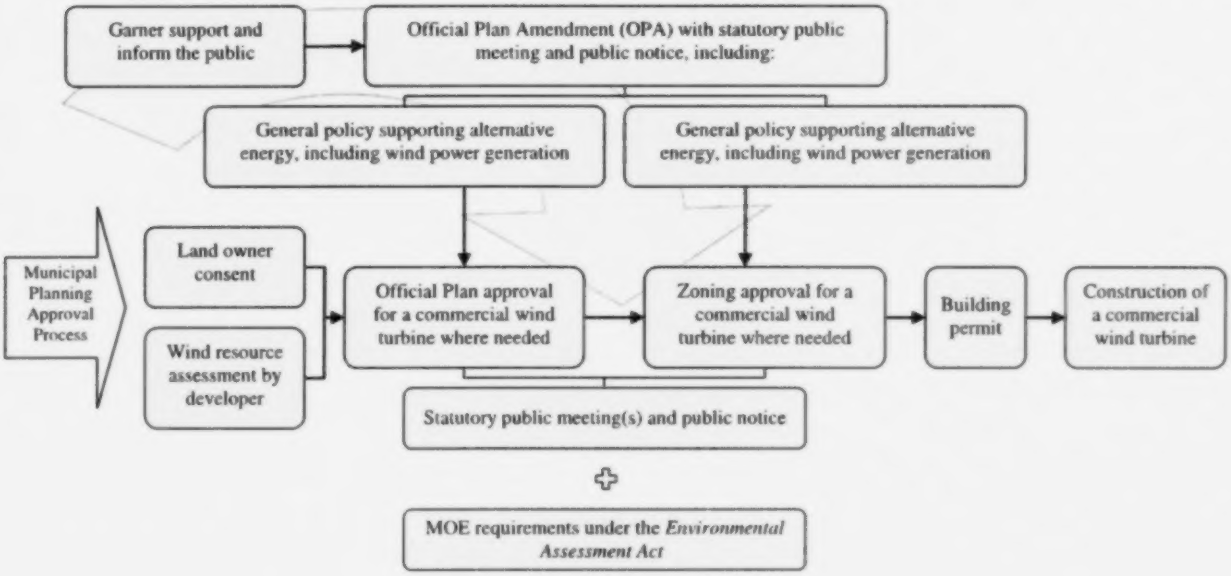
The GHGs act like the glass of a greenhouse by preventing heat from the sun from escaping out of the earth's atmosphere. This results in global warming and more frequent extreme weather.

The combustion of fossil fuels is an important factor in climate change and also affects our environment and our quality of life by contributing to smog, acid rain, and toxic substance to the atmosphere. Smog events are likely to become both more frequent and longer lasting as the warmer temperatures and prolonged heat waves brought about by climate change provide the conditions that allow smog to form, particularly in urban and industrialized areas. Therefore, programs that reduce GHG emissions are helping to address the problem of poor air quality.

Many municipalities have developed or are exploring action strategies to address climate change and reduce GHG emissions. These action strategies generally involve initiatives at the operations level, changes to policy and regulations, and the awareness and education of the community. Several partnerships have been established on both the national and the local levels, such as the Partners for Climate Protection, mentioned earlier, and the City of Toronto's Better Building Partnership, which promotes the implementation of energy retrofits on local industrial, commercial, institutional and multi-residential buildings as a means of reducing carbon dioxide emissions.

Using alternative sources such as non-fossil, fuel-based energy can substantially reduce GHG emissions from municipal operations. Alternative energy sources are typically clean, natural sources of energy that provide heat and electricity without damaging the environment and depleting resources over time. A few of the alternative energy initiatives underway in Ontario are mentioned in the next section.

Municipalities can play a key role in encouraging the development of alternative forms of energy by building community support through early consultation and the establishment of a clear planning framework. The following diagram illustrates the planning framework that could be used for a wind energy development application.


Garner support and inform the public
Official Plan Amendment (OPA) with statutory public meeting and public notice, including:
General policy supporting alternative energy, including wind power generation
General policy supporting alternative energy, including wind power generation
Municipal Planning Approval Process
Land owner consent
Wind resource assessment by developer
Official Plan approval for a commercial wind turbine where needed
Zoning approval for a commercial wind turbine where needed
Building permit
Construction of a commercial wind turbine
Statutory public meeting(s) and public notice
MOE requirements under the *Environmental Assessment Act*

Source: The Ministries of Energy and Municipal Affairs and Housing Wind Energy Fact Sheet

Economics and Smog

Financial justification often makes a stronger case for change than any other issue. Losses to the economy could result from health-care costs, reductions in agricultural yields, potential losses in tourism dollars, as a result of decreased visibility at scenic tourist destinations, and the costs of repairing materials used in buildings, statues, and monuments that are damaged by smog.

Health Care Costs

The Ontario Medical Association (OMA) in their technical report on the Illness Cost of Air Pollution forecasted for 2000 that approximately $10 billon in annual economic damages will occur as a result of smog related health care costs. This total can be broken down as follows:

- $4.1 billion for loss of life;
- $4.8 billion for pain and suffering;
- $600 million in annual health care costs associated with air pollution; and
- $560 million in damages annually for lost productivity.

It is important to note that a great level of uncertainty exists in identifying a cause-and-effect relationship between smog and smog-related illnesses. As such, pollutants are often identified as contributing factors to related illnesses as opposed to directly and solely causing these illnesses. There is simply not enough information from both the medical and economic sciences to be able to calculate or obtain exact measurements of these externalities.

The OMA predicts that over the next 20 years, these economic damages will increase considerably without mitigating responses from Ontario and the U.S. Regardless of the differences in estimates or the percentage of increase expected, most would agree that there are significant health care costs associated with air pollution. Actions to reduce air pollution and better protect sensitive populations are economically justified, while further research would also be beneficial.

Agricultural Costs

Smog is also known to cause severe damage to plant life, making them more vulnerable to pests, disease, and other harmful environmental impacts. Ground-level ozone alone has been estimated to cause anywhere from 10 to 40 per cent growth loss in plants, premature aging, and a decrease in pollen lifespan resulting in a cost to agriculture of $2 billion to $6 billion per year. In the United States, smog has been attributed to reduced crop yields equivalent to between $1 and $3 billion annually. In Ontario alone, agricultural losses dues to ground-level ozone have been estimated at approximately $70 million annually. A study conducted by the EPA forecasted that the continuous implementation of *Clean Air Act* Amendments between 1990 and 2010 would accumulate agricultural benefits of approximately $4 billion.

In addition to losses in crops, damage to forest can also have negative economic affects as ground-level ozone has been determined to cause damage to trees, such as the sugar maple tree, harvested by the forestry industry.

Tourism Costs

Reduced visibility in Canadian scenic destinations, such as national parks and wilderness areas, by as much as 80 per cent could result in substantial losses in tourism dollars. History shows that tourism can be negatively impacted by air pollution as was the case in the 1997 forest fires in Indonesia. While Canada is better equipped to deal with such crises, the economic losses associated with tourism due to smog are an important factor worthy of consideration.

Material and Aesthetic Costs

In addition to a loss of tourism dollars due to the reduced aestheticism of a local community from smog damage, there is the cost of repairing the damage. Contaminants like sulphur dioxide can corrode metals and stones, causing damage to buildings, statues, and monuments, while ground-level ozone can damage synthetic materials, such as by causing leather to become brittle and rubber to lose its elasticity, resulting in cracks. Ground-level ozone has also been found to damage cotton, acetate, nylon, polyester, and other textiles, while bleaching dyes, paints and coatings. While it is uncertain as to how much is exactly spent on the cleaning or replacement of materials, a couple of million dollars is considered to be a reasonable estimate. In Canada, increases in ground-level ozone from the United States have been estimated to cost up to $1 billion in material damages.

SECTION 3: MUNICIPALITIES IN ACTION

The type and breadth of municipal smog alert response initiatives are constantly evolving. The following section highlights examples of municipal actions across Ontario. In an effort to demonstrate that municipalities of all sizes can develop and promote initiatives that make a difference, examples are provided that focus on both larger and smaller municipalities. The following list is by no means exhaustive. It is merely intended as a sampling of some of the initiatives underway by regions and municipalities in Ontario which may be of interest to others who have not yet engaged in the process of smog alert response or undertaken similar initiatives.

CORPORATE PLANNING TO ADDRESS AIR QUALITY

Developing Smog Alert Response Plans

Many of the municipalities throughout Ontario have developed or are in the process of developing smog alert response plans. Estimates indicate that approximately 27 per cent of upper and single tier municipalities have developed some sort of smog response plan, while less than five per cent of Ontario's lower tier and separated municipalities have developed detailed local plans. Many of these municipalities have Council approval and dedicated staff to support implementation of the plan and outreach activities.

Municipalities that have established or adopted smog alert response plans include Durham, Niagara, York, Halton, Waterloo and Peel Regions, Essex and Lambton Counties, the cities of Toronto, Hamilton, Ottawa, Mississauga, Cambridge, Guelph, Windsor, Sarnia, Burlington, Kitchener, and Waterloo, the towns of Markham, Halton Hills, Milton, Oakville, Richmond Hill and Whitchurch-Stouffville, and the townships of Wellesley, Wilmot, Woolwich, and North Dumfries.

Establishing a More Comprehensive Outlook to Smog Response Planning

Municipalities such as Hamilton have developed a longer-term management strategy that describes action to be taken to reduce smog levels over the long term. These strategies include:

- Sponsoring an Upwind Downwind Conference and community network initiative;
- Implementing an anti-idling by-law;
- Approaching corporate partners to assist in notifying the public and encouraging community and employee participation;
- Developing and implementing fleet greening policies;
- Sponsoring a regional tree planting program;
- Implementing a pesticide reduction strategy; and
- Completing a VISION 20/20 survey.

Several of these strategies have already been implemented, including the Upwind Downwind Conference, which is hosted by the City of Hamilton every two years and explores practical solutions to urban and rural air quality issues. Corporate partners such as Dofasco and Stelco continue to actively participate on the local air quality steering committee, Clean Air Hamilton. The city has also continuously supported the regional tree planting program by providing funding every year since its inception. A survey of local programs and initiatives that contribute to the VISION 20/20 goals of the city was completed and compiled into the City Action Inventory Report. To facilitate the adoption of an anti-idling by-law, the city is working on a city-wide anti-idling education campaign, which includes the posting of signs on city property, at all GO Stations and bus terminals. Other longer term strategies already underway include the development of a green fleet transition plan which recommends the use of hybrid vehicles and alternative fuels in the municipal fleet, as well as the implementation of a pesticide reduction strategy by the public health department.

Some municipalities have also established departmental smog response plans and encouraged departmental heads to take initiative in assessing progress and results achieved as well as the development of new initiatives. For example, the Corporate Smog Alert Response Plan in the City of Toronto has been adopted by City Council as part of its corporate policy. The plan authorizes city divisions to develop and implement their operation-specific smog alert response plans on smog alert days. Many divisions have developed their own smog alert response plans and these plans are posted on Toronto's intranet site. Divisions are also requested to review and revise their plans each year as new information is made available. These divisional plans have been adopted by City Council and are part of the corporate policy.

The City of Mississauga staff explore new options each year, as departments are encouraged to implement their own initiatives. For example, the Recreation and Parks Division have acquired three electric utility vehicles for maintenance work, E-Gators, which run throughout the business day and are recharged overnight. It is expected that these off-road electric vehicles will eventually replace all gasoline powered ones. The Mississauga Fire and Emergency Services Division is another example to note. Staff explored options to reduce live-fire training[5] on smog days. Initially, they restricted the training on such days but found the resulting schedule delays problematic. To resolve this issue, staff advanced the live-fire training schedule to March and doubled up on the number of staff that took the training at any one time.

Promoting the Merits of Environmental Steering/Advisory Committees

A number of municipalities have established citizen advisory groups or steering committees dedicated to the protection of the natural environment. The committees are typically comprised of a diverse group of citizens that are appointed by the City/Regional Council. Steering or Advisory Committees often conduct research related to environmental issues, promote public education, review public policies and processes, encourage local action and liaise with other organizations interested in environmental issues and the sustainability of communities.

For example, the Caledon Environmental Advisory Committee (CEAC) consists of 18 to 24 members including representatives from the agricultural community, the school system, and two members of Council. CEAC's mandate is to advise and assist both Council and citizens in the protection, enhancement, restoration, management and appreciation of Caledon's natural heritage. Over the years, the CEAC has initiated a wide range of projects, including initiatives related to local sustainability, climate change and air quality. Several more recent projects have led to Caledon joining the International Council for Local Environmental Initiatives (ICLEI) and its Partners for Climate Protection (PCP) program, and the establishment of the COOL Caledon Task Force. A current project could potentially lead to Caledon developing its first smog alert plan.

The Durham Environmental Advisory Committee (DEAC) is another example. DEAC is comprised of 14 technical and non-technical members to provide advice on environmental planning matters and issues affecting Durham Region. An important initiative has been the establishment of an awards program to publicly recognize those who have significantly contributed to the creation, maintenance, and/or promotion of a healthy environment.

---

[5] Fire in a demonstration building

MUNICIPAL IMPROVEMENT THROUGH RESEARCH

The following are some examples of research initiatives that are being conducted by Ontario municipalities to develop a more comprehensive understanding of the effects of smog, both environmental and health related.

Research to Collectively Reduce Emissions – GTA Clean Air Council

The GTA Clean Air Council promotes clean air initiatives and smog reduction best practices through workshops, pilot initiatives, and reports on critical issues. The GTA-CAC has undertaken research projects that explore and promote workable solutions and opportunities for members to reduce emissions individually and collectively. A report Green Power Opportunities for the GTA Clean Air Council has been completed which suggests options for municipalities including purchasing electricity from renewable sources and options for local and self-generation of sustainable power. Other available reports that can be found at: www.cleanairpartnership.org/gtacac include:

- Fuelling Clean Air: Municipal Fuel Purchasing Policies that Improve Air Quality and/or Retard Climate Change;
- Steps to Clean Air: Analysis of GTA Clean Air Council's Clean Air Inventory and Recommendations for Best Practices Guide;
- Research options for partners to collectively reduce emissions;
- Development of GTA wide renewable energy portfolio, low-sulphur fuel purchase standards, and an anti-idling education campaign.

Small Town Sustainability Planning

In order to accommodate rapid growth in a sustainable fashion, the Town of Milton will conduct a feasibility study on the introduction and integration of sustainable infrastructure, services, land-use planning, transportation and urban design. Milton has received $100K from the Green Municipal Funds (GMF) and additional support from founding partners, including Province of Ontario – Smart Growth, the Region of Halton, Rogers Cable, and Mattamy Development Corporation. It will investigate and identify the planning strategies to support an ecovillage, made up of ecologically sustainable or low impact, high-performance "green buildings" and smart-wired. high technology, live-work communities. The outcome of the study will be a strategy to develop a sustainable Eco-Tech Village for Milton.

Research on Health Effects of Smog

With the aim of a more complete understanding of the health effects of smog, the Region of Waterloo is involved, as a tertiary partner, in a research project with the University of Waterloo developing health exposure models. One focus of the research project is how people's proximity to heavy traffic routes, such as urban transportation corridors and highways, affects their health. They are also researching how local initiatives can make a bigger impact on the reduction of criteria air contaminants than previously thought, in hope of being better able to emphasize the importance of local action in improving air quality.

The Region of Waterloo is now in year two of this five-year research project. Once the models have been validated, the intent is to make the information available to other municipalities and health agencies. An example of how the end product could be used is within transportation planning and Smart Growth approaches which can reduce traffic congestion and proximity of parks to regional roads and highways for example.

The City of Toronto has continued to conduct and participate in a number of health based research to address the impact of smog on human health. These include:

- **Exercise and Air Quality Research** (2003) – to guide the development of, and promote health protection messages for the public on performing physical activities on smog alert days;
- **Burden of Illness Study** (2004) – to re-assess the air pollution-related premature mortality and hospitalizations associated with Toronto concentrations of key smog-related pollutants;
- **Heat/Smog Research** – a major research project with Environment Canada to look at synergistic impacts of weather and air pollution as it relates to health; and
- **Personal Exposure Monitoring Study** with partners at the University of Toronto, Health Canada and Environment Canada – to measure common air pollutants in Toronto microenvironments and to assess the efficacy of smog alert advice.

PRIVATE SECTOR INVOLVEMENT AND INITIATIVES

More and more municipalities are turning to industry to sit as members of their Clean Air Committees and the governing bodies responsible for smog alert response. The Guelph Air Quality Advisory Plan encourages industry and business to participate in the plan and generate a long term abatement strategy for point sources of air pollution. In addition, Guelph is in the process of establishing a Community Energy Plan to get the community and industry involved in energy reduction initiatives. Representatives from industry also sit on the Windsor-Essex County Environmental Committee. The following are examples of joint initiatives within the industrial sector:

Hamilton Air Monitoring Network

The Hamilton Air Monitoring Network promotes self-monitoring of industrial emissions of some 22 industries in the area of Hamilton including Stelco Inc. and Dofasco Inc. The network is formal and voluntary, with companies paying into the network based on estimated emissions. A contractor collects and monitors the data which is submitted to the Ministry of the Environment to ensure compliance with regulations and standards.

Sarnia-Lambton Environmental Association

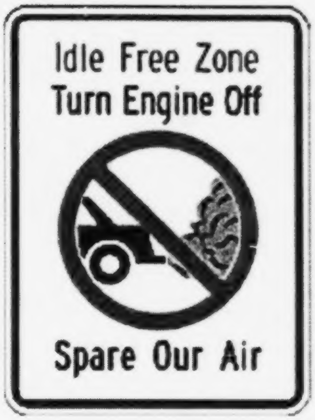
The Sarnia-Lambton Environmental Association is an industry association with about 18 members that assess and promote the protection of the environment. The air monitoring section of the system consists of seven air monitoring stations which analyze local air quality by taking hourly air samples and recording the averages of contaminants present. The monitoring network tracks sulphur dioxide, ozone, nitrogen oxides, volatile organic compounds, particulate matter, and total reduced sulphur.

REDUCING VEHICLE EMISSIONS: ANTI-IDLING PROGRAMS

A rising number of Ontario municipalities are implementing "idle-free" campaigns and program to encourage people to stop leaving their vehicles running while they are parked.

Anti-idling programs can make a difference. According to Natural Resources Canada (NRCAN), if every driver of a light-duty vehicle in Canada avoided idling for just five minutes per day, every day of the year, we would save more than 930 million litres of fuel, worth more than $640 million. The following are examples of some of the initiatives recently implemented in Ontario.

Sudbury and Mississauga Idle-Free Campaigns


Idle Free Zone
Turn Engine Off
Spare Our Air

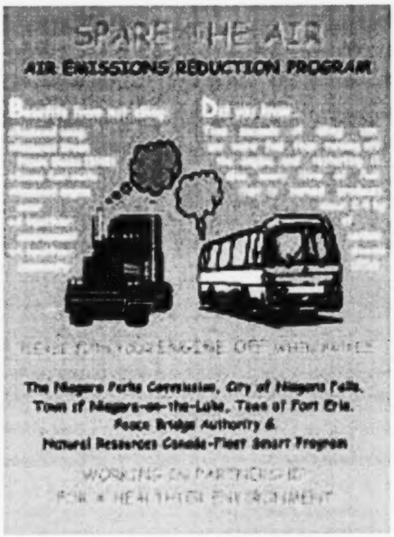
The goal of these campaigns was to test the effectiveness of the anti-idling tools and information offered on NRCAN's Web site, *The Idle Free Zone*. One of the objectives of the campaigns was the reduction in engine idling by parents, caregivers, and bus drivers, by creating idle-free zones around schoolyards in each city. Signs were posted in designated visible areas. The campaign in Greater Sudbury targeted all 49 schools throughout the city. The campaign in Mississauga targeted 20 of the more than 200 schools, which had experienced problems with vehicle idling in the past or wanted to take part in a proactive environmental project. The remaining schools in Mississauga received anti-idling information kits, which included background information about idling, posters, curriculum-based activities, and ready to use inserts for school newsletters. A two-tiered approach was used by both cities, which involved:

1. **Public Awareness Campaigns** (e.g., posters, advertisements, media, etc.); and
2. **Community-Based Social Marketing** which focused on behaviour change through personal contact (e.g., interventions at schools).

The Mississauga and Greater Sudbury School Anti-Idling Campaigns were quite successful, with significant reductions observed in both the amount of idling vehicles and the length of time spent idling:

CITY RESULTS	PRE-CAMPAIGN	POST-CAMPAIGN	PER CENT REDUCTION
MISSISSAUGA			
IDLING FREQUENCY	54%	29%	46%
IDLING DURATION	8 min. 15 sec.	3 min. 36 sec.	56%
GREATER SUDBURY			
IDLING FREQUENCY	50%	33%	34%
IDLING DURATION	3 min. 40 sec.	2 min. 30 sec.	32%

Niagara Falls/River Corridor: Spare the Air Campaign


SPARE THE AIR
AIR EMISSIONS REDUCTION PROGRAM
Did you know:
The Niagara Parks Commission, City of Niagara Falls,
Town of Niagara-on-the-Lake, Town of Fort Erie,
Peace Bridge Authority &
Natural Resources Canada-Fleet Smart Program
WORKING IN PARTNERSHIP
FOR A HEALTHIER ENVIRONMENT

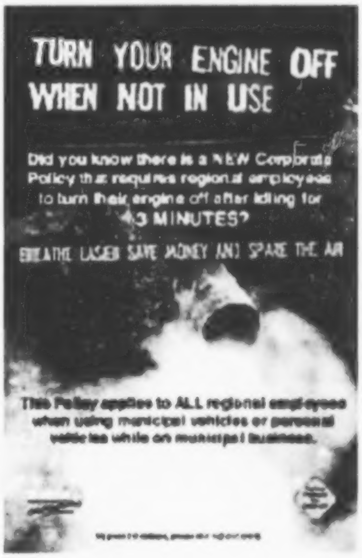
With more than 10,000 tour buses visiting the Niagara River Corridor each year, the Niagara Parks Commission (NPC) saw a need to clear the air about unnecessary idling. In partnership with three different municipalities (the City of Niagara Falls, the Town of Niagara-on-the-Lake, the Town of Fort Erie), the Peace Bridge Authority and the Government of Canada, the NPC launched the "Spare the Air" Emissions Reduction Program. Originally targeted at buses, the program has recently been expanded to include the many transport trucks that use the International Peace Bridge.

The program has focused on the 27 sites in the Niagara area where trucks and buses gather. "Spare the Air" signs have been posted on these sites, coupled with the distribution of information brochures to company owners and drivers, and media promotion. The program encourages drivers of all motor coaches and trucks to turn off their engines when parked.

According to the NPC Chairman Brian Merrett, "We've already seen great results, with dramatic positive changes to air quality." The program has achieved extraordinary reductions in tour bus idling, now down from an average of 45 minutes to less than seven minutes. According to the NPC this translates into a reduction of 3,200 tonnes of carbon dioxide emissions.

Anti-Idling By-Laws

A number of municipalities across Ontario have implemented anti-idling by-laws, including the Cities of Guelph, London, Toronto, Burlington, Oakville, Windsor, Stratford, Kingston, Brampton, Ottawa (as part of their noise by-law), and Niagara Falls. For example, Sarnia-Lambton has a truck-idling program focusing on the 8,000 trucks travelling between Sarnia and Windsor every day. The City of Burlington recently passed their by-law, in June of 2004, and it comes into effect in May of 2005. To tackle the difficulty in enforcing the by-law, the by-law in Burlington will be enforced by city-parking enforcement officers. Burlington decided that their maximum idling time would be three minutes (with some exceptions) while the City of Oakville, who passed their by-law in August of 2002, decided on a maximum of five minutes.


TURN YOUR ENGINE OFF WHEN NOT IN USE
Did you know there is a NEW Corporate Policy that requires regional employees to turn their engine off after idling for 3 MINUTES?
BREATHE EASIER SAVE MONEY AND SPARE THE AIR
This Policy applies to ALL regional employees when using municipal vehicles or personal vehicles while on municipal business.

REDUCING VEHICLE EMISSIONS: TRANSIT INITIATIVES

Several municipalities across Ontario are examining strategies to increase the use of public transportation and reduce the emissions associated with the transportation sector. Whether through the use of public education and awareness events, financial incentives, the implementation of internal green fleet policies or the redevelopment of existing transit routes, municipalities recognize the need to reduce single occupant vehicles on increasing congested roadways and decrease the release of smog-causing pollutants into the air. Some of the ways municipalities are addressing these issues include:

Smart Commute Initiative

This initiative aims to reduce peak period automobile travel by encouraging measures that reduce single occupant vehicles and promote alternative modes of transportation, which in turn will help reduce greenhouse gas emissions. This three-year pilot program was funded in late 2003 under the federal Urban Transportation Showcase Program. A Smart Commute Association is being formed to oversee initiatives and strategies will be tailored to local conditions and may include programs that facilitate GTA-wide ride-sharing, vanpooling, bicycling and walking, as well as the establishment of nine additional transportation management associations across the GTA. Involved municipalities include: Region of Durham, Region of York, Region of Peel, Region of Halton, City of Toronto, City of Hamilton, Town of Markham, Town of Richmond Hill, City of Mississauga, City of Vaughan, City of Newmarket, City of Brampton, and the City of Burlington.

Free Transit Programs

In the summer 2003, the City of Windsor earmarked $30,000 to allow city residents to ride public transit free of charge on days when a smog advisory was issued. Environment Canada matched the city contribution, providing Transit Windsor with a total of $60,000 for the season. The results were significant as Transit Windsor ridership on these days increased by 45 per cent. At $15,000 per day, Transit Windsor was able to provide four free transit days with a great deal of favourable public attention. On June 2, 2004, Clean Air Day, the City of Thunder Bay randomly awarded free transit tickets to people who were wearing Clean Air Day badges or temporary tattoos. Kingston also provides free transit on Clean Air Day each year and other municipalities such as the Region of Waterloo and the City of Guelph are implementing some variation of a free transit program in their regions.

Let's
the Air!

Green Fleets Policy

Toronto City Council adopted the Green Fleet Transition Plan 2004-2007 on May 18, 2004; this plan sets a path that will reduce emissions produced by the city's fleet by up to 23 per cent in four years over business-as-usual. The city pledges that "over the next four years, the city's Fleet Services will transition into a green fleet." By implementing their Green Fleet Transition Plan 2004-2007, Toronto will replace 84 per cent of its new light duty vehicle planned replacements with hybrid electric vehicles. Some of the highlights of their plan include:

- Right sizing the city's fleet by reducing gasoline engines from eight to six cylinders where feasible.
- Certifying Fleet Services' maintenance yard to ISO 14001 environmental standards.
- Having fleet Services use biodiesel in all diesel-powered vehicles.
- Reducing equivalent CO_2 emissions produced by the city's fleet by 23 per cent.
- Reducing equivalent CO_2 emissions by 10 to 15 million kilograms over the next four years.

Hamilton's Stage II strategies to implement their smog alert response plan include developing green fleet policies and encouraging the use of alternative fuel-powered fleet vehicles, which use such fuel as electricity, methanol, ethanol, natural gas, and propane. Other cities are exploring and or implementing green fleet policies and/or using hybrid vehicles that combine batteries with gasoline engines and hence significantly reduce emissions.

Municipal Shift to Biodiesel Fuel

The City of Brampton is the first municipality in Canada to commit to using biodiesel fuel, an environmentally friendly mix of diesel and soybean oil, for its fleet of trucks and small-engine machines. From June to September, the city used a B50 blend of biodiesel – 50 per cent soybean oil and 50 per cent diesel – which reduced vehicle emissions by 50 to 60 per cent. From October until April the city switches to a B20 blend (20 per cent soybean oil, 80 per cent diesel) to avoid the fuel congealing due to the colder temperatures. During the smog alert months of July, August and September next year, the city plans to use B100 fuel. The response to biodiesel has been extremely positive and as of June 2003, City Council has committed to the permanent use of B20 biodiesel fuel for its fleet of 130 transit buses.

Another noteworthy example is the City of Burlington. The city found that they were falling behind in maintenance due to the number of smog days and decided to switch all their off-road equipment to run on biodiesel. For the months of May, June, and September, the municipal fleet runs on B20, which is a mixture of 20 per cent biodiesel and 80 per cent regular diesel. For July and August the municipal fleet runs on B50.

REDUCING TRAVEL BY CURBING URBAN SPRAWL

A study of various environmental indicators of quality was conducted by the National Round Table on the Environment and the Economy (NRTEE), which identified three key areas that contributed to the traffic congestion associated with "urban sprawl" in Canadian cities:

- The increase in urbanized land has exceeded the increase in population since 1981;

- Since 1990, there has been a significant decrease in transit ridership, which had experienced a steady increase since 1960; and
- Automobile commutes have become longer and longer, with passenger-kilometres growing substantially faster than that of the population.

The Case of Toronto

Through the analysis of vehicle use in Toronto, the Centre for Sustainable Transportation found a direct correlation between urban form and commuting distance: residents of Toronto's downtown core commuted on average approximately 7 kilometres per day, while residents of the surrounding suburbs commuted on average approximately 22 kilometres per day.

The City of Toronto is exploring the implementation of land use and planning policies that will enable a more sustainable form of growth. Toronto's Official Plan, adopted by City Council in November 2002, contains a number of policies designed to encourage a compact urban form including: focusing urban growth into a pattern of compact centres and corridors connected by an integrated regional transportation system; making better use of existing urban infrastructure and services; reducing auto dependency and improving air quality; increasing the supply of housing in mixed use environments for people to live and work locally; and protecting, enhancing and restoring the region's system of green spaces.

The Case of Vaughan

The City of Vaughan has implemented a "block plan" approach to manage growth throughout its new communities whereby community plans for each entire concession block must be prepared and approved by City Council before development may proceed. The plan is designed to focus medium and high-density housing along major arterial roads where transit services will operate.

When complete, the city's new urban areas will have residential densities distributed in a manner to support and encourage public transit ridership. A wide range of housing choices will enable a broader range of households varying in composition and income to live and work in the city, thereby reducing the distance to work and the need to commute. Three new community planning areas will each have a development node where shopping and transit services will be focused and supported by concentrations of housing.

ENERGY CONSERVATION: AUDITS AND MANAGEMENT STUDIES

As part of their commitment to the Kyoto Accord to reduce greenhouse gas emissions, some municipalities have conducted energy audits, implemented energy retrofits, and researched potential energy management tools in an attempt to reduce energy use in municipal buildings as well as local facilities and community households. The following examples outline a few of these energy reducing strategies:

COOL Caledon's Electricity Doctor

Sponsored by the Town of Caledon and committed to the improvement of air quality through the reduction of greenhouse gases, smog, and other harmful air pollutants, the COOL Caledon taskforce is comprised of volunteers and town employees. One of the organization's more unique initiatives is the provision of free home energy audits to local citizens by COOL Caledon's Electricity Doctor. The Electricity Doctor assesses a home owner's lighting, hot water and heating systems, appliances, and electronic devises to determine where and how they can reduce energy consumption. The goal of the COOL Caledon program is to educate and raise awareness of simple actions public can take to reduce energy use, save money and clear our air in the process.

Windsor Energy Management Study

The City of Windsor wanted to reduce its energy costs and improve its energy efficiency. An energy service company (ESCO) was contracted to conduct an energy management study to identify possible retrofits to existing facilities and any potential savings from the implementation of these retrofits. Recommendations included upgrading facility lighting, upgrading air handling systems and replacing boilers to more energy efficient alternatives. The city used a three-phased approach to the implementation of the energy efficiency improvements. The first phase covered 19 Parks and Recreation Department facilities, the second phase involved several municipal facilities, including City Hall, the Fire Department and the Transit Centre, and the final phase focused on the main municipal library. Windsor estimated that with energy savings projected at $560,000 per year, all retrofits would have paid for themselves over a period of 7 to 10 years. The energy retrofits have performed above their projected 5.7 million kilowatts per year energy savings, which enabled the city to provide low-cost, high-quality, energy-efficient services to their residents without an increase in property taxes. The energy savings from the ESCO program also enabled the city to fund approximately $3.6M in capital energy retrofit expenditures.

Waterloo Emission Reduction Inventory

Spearheaded by the local Commissioners and Public Health staff, the Region of Waterloo implemented an Emission Reduction Inventory initiative in 2002. An external consultant, working with an internal interdepartmental team examined several operational areas for emission reduction and cost saving potential and prepared a list of 30 potential initiatives, including demonstration projects (e.g., solar panels on buildings), the use of alternative technology and fuels to reduce vehicle emissions, and alternative technology for street lighting and traffic lights. The region evaluated each potential option with respect to emission reduction potential, cost, feasibility, social profile, and experiences in other jurisdictions, and narrowed the list down to 11 initiatives. Several initiatives were approved by the Waterloo Regional Council for immediate implementation, with several more to be undertaken over the next few years. Through implementation of these initiatives during 2003-2005, Waterloo Region's projects will reduce annual criteria air contaminant emissions in excess of 69,000 kg, approximately a 10 per cent decrease from 2002.

Toronto Retrofit of Municipal Buildings

The Federation of Canadian Municipalities announced at the 2004 Smog Summit that it will be investing $8.75 million in funds from its Green Municipal Investment Fund to enable the City of Toronto to implement an energy and water efficiency retrofit program for municipal buildings. Through the retrofit program, the city intends to reduce the amount of energy used in municipal buildings and facilities and maximize energy savings. These retrofits follow closely to the plan adopted by Council in February 2003, which requires the reduction of energy consumption in city-owned buildings by 15 per cent by 2005. A 15 per cent decrease in energy use would result in the reduction of 8,600 tonnes of CO_2 annually, 62 per cent of the city's overall target for the reduction of CO_2 emissions. Retrofits are also being conducted on 100 city indoor and outdoor arenas, which are projected to pay for themselves over approximately eight years as energy use declines and savings increase.

York Region's Energy and Environmental Management System

To assist with their energy audits, York Region developed an Energy and Environmental Management System (EEMS) as part of their Energy Management Strategy. This web-based software tracks energy consumption and the related expenses of municipal buildings, facilities, and street lights. EEMS can track electricity use, water and waste accounts, and natural gas use among others, and analyze utility performance. The municipality can then use this information to determine where energy and emission reduction initiatives could be implemented.

ENERGY CONSERVATION INITIATIVES

The Mayors' Mega-Watt Challenge

Championed by the Mayor of Mississauga, the Mayors' Mega-Watt Challenge brings together mayors from across the Greater Toronto Area. Participating municipal governments are pooling their energy management knowledge and experience to achieve at least one megawatt of electrical demand savings during 2003 and 2004. A total of 12 municipalities have been participating, joining together to promote the expansion of their energy efficiency programs for their buildings.

The goal was to reduce energy consumption in each municipality by one megawatt in 2004, and the savings in energy would also bring reduced greenhouse gas emissions and improved air quality, as well as reduced municipal operating costs. The challenge provides a means of sharing technical experience and best practices, as well as benchmarking facility performance.

One Tonne Challenge

The One Tonne Challenge is a Government of Canada climate change initiative that asks participants to reduce their greenhouse gas emissions by one tonne annually, which is approximately a 20 per cent reduction. The challenge promotes minor adjustments to your every day life, including energy efficiency and driving less or carpooling.

There are currently 10 communities participating in the One Tonne Challenge. One of which is the City of Peterborough, with 'Peterborough Green-Up', an environmental non-government organization, leading the initiative in partnership with the city and local health unit.

20/20 The Way to Clean Air

Coordinated by Clean Air Partnership, this program was launched in June 2002 to help individuals and families across the GTA reduce home energy and vehicle use by 20 per cent. A number of regional health units are participating in this program including Toronto, Durham, York, Peel and Halton. A 20/20 Planner, the main program resource, is available free to GTA residents. The Planner guides participants through a range of energy saving options to help reach their 20 per cent reduction goal. Options include simple no-cost actions such as turning down the thermostat overnight by three to five degrees to save up to four per cent of heating costs and upgrading basement insulation to reduce costs by as much as 10 per cent.

A number of employers have also signed up as 20/20 workplaces to promote the program to their employees. They include DuPont Canada, Enbridge Gas Distribution, Environment Canada (Ontario Region), Exhibition Place, Region of Peel, Toronto East General Hospital, Toronto and Region Conservation Authority, Town of Richmond Hill, Town of Oakville, Telus Mobility, Transamerica Life (Aegon), University Health Network (Princess Margaret Hospital, Toronto Western Hospital, and Toronto General Hospital), and York University.

20/20
THE WAY TO
CLEAN AIR

Light Emitting Diode Lamps (LEDs)

The City of Burlington has installed long lasting, energy efficient light emitting diode (LED) traffic and/or pedestrian signals at 46 of 159 signalized intersections. LEDs produce highly visible light under all driving conditions and consume 80 to 90 per cent less energy than incandescent signals, reducing equivalent CO_2 emissions. While LEDs are still more expensive to buy than incandescent lights, they use only about 9 to 25 watts, compared with 60 to 150 watts for incandescent lights. Since traffic signals operate 24 hours a day, 365 days a year, the opportunity for savings is large. Maintenance costs are also reduced because LEDs generally last five to eight years, compared to just one or two years for incandescent light signals.

In fall of 2003, the City of London approved a program to replace its incandescent traffic signal heads with energy efficient LED displays. The project was to run from 2003-2005 and was estimated to cost approximately $2,100,000. The city calculated that the higher cost of the LED equipment was offset by the 80 to 90 per cent reduction in electricity consumption.

By mid-2004, traffic and pedestrian signals at all 390 intersections in Mississauga were converted to LEDs. The investment of $1.6 million in this retrofit project is expected to produce annual energy cost savings of $460,000 at current hydro rates. Since savings in maintenance costs (i.e., cleaning and relamping signals, response to calls for relamping, etc.) is also expected to be reduced by approximately $150,000 per year, a total of over $600,000 and 1,344 tonnes of CO_2 (equivalent greenhouse gas emissions) will be saved annually. The project was also viewed as an important initiative for improving local air quality and decreasing greenhouse gas emissions in a broader sense, by reducing the need for electricity produced by coal burning generators.

Demand Side Management Response: Milton's Interval Metering Program

The Town of Milton's was recently recognized by Natural Resources Canada for the implementation of its interval metering project. The initiative involves equipping every new home built within the Milton Hydro service area with an interval meter in order to measure energy consumption. The meters are capable of recording natural gas and water use, so customers can track their overall utility consumption on an hourly, daily, weekly, monthly or even annual basis. The expectation is that interval metering combined with time varying pricing will encourage the general public and industrial and commercial consumers to change their habits by reducing discretionary consumption when prices are high. An additional benefit should be to ease the overall strain on the province's supply of electricity during peak consumption periods.

PROMOTING RENEWABLE ENERGIES

Wind Energy

There are a number of areas in Ontario (mostly on the leeward side of the Great Lakes) that have sufficient wind resources to justify the development of a wind turbine, however only a few have implemented this alternative form of energy. Among others, wind turbines can now be found in Toronto, Ferndale, Pickering, Port Albert, and Tiverton, which was the site of the first turbine built in Ontario.

The Greater Kingston Trade Winds Project

Through the Greater Kingston Trade Winds Project, retrofits are implemented at city-owned buildings to ensure electrical and heating energy systems are more efficiently operated, thereby reducing the emissions of gases that cause climate change and pollution. It is anticipated that once the capital costs of retrofits are repaid, some of the operational money saved from energy costs due to the increased efficiency of the buildings could be directed towards the purchase of green power, including electricity generated by the proposed 36 megawatt wind turbines on Wolfe Island. Steps have already begun toward the development of the turbines, including the completion of a wind study on Wolfe Island, a study of the potential impact on the Hydro market, and a detailed project design. The Project was funded in part by the City of

Kingston and the Township of Frontenac Islands, in collaboration with a number of private sector organizations, whose contributions totaled $200,000 and in part by the Federation of Canadian Municipalities' (FCM) Green Municipal Enabling Funds (GMEF), which contributed an additional $200,000.

Solar Powered Heating

As part of its Strategic Energy Plan, the City of Greater Sudbury installed two passive solar walls in two facilities – the Wanapitei Water Treatment Plant and Sudbury Sewage Treatment Plant. The project involved mounting perforated plates on the southern side of the building to collect the solar energy and installing a fan to provide solar heating air to the building's distribution system. The solar walls generate annual savings of about $21,000 in electrical energy costs. This is equivalent to some 54 tonnes of CO_2 emissions.

The Town of Perth has collaborated with the local environmental organization, ecoPerth, to establish a solar heater program, which involves the retrofit of local homes and buildings with solar panels. These panels capture the sun's energy redirects this energy to heat the building's water supply. The benefits of this program include the reduction of water heating costs by approximately 50 per cent and the reduction in energy use, thereby decreasing the production of greenhouse gases. Although primarily run by ecoPerth, the Town has cooperated by posting a solar map of Perth on their Web site and offering $100 to the first 10 solar installations in town.

Positive Power

Positive Power is a non-profit co-operative dedicated to promoting and generating clean, sustainable energy through community-based renewable energy projects and education. Positive Power has been actively researching the potential of wind turbines in the Halton, Hamilton, and Haldimand jurisdictions.

GREENING INITIATIVES

Whether through the acquisition and protection of existing natural land or through the establishment of gardens atop man-made structures, more and more municipalities are recognizing the benefits of greening initiatives, which include improving air quality, reducing emissions, and lessening the effects of the urban heat island. The following examples highlight a few of the projects that have been implemented. Several more municipalities are in the process of considering or developing similar initiatives.

Green Space Planning

The Town of Newmarket is one of the most densely populated towns in Ontario. Efforts to reduce smog have focused on education and green space planning. In 2003, the Town established a dedicated one per cent reserve fund for environmental land acquisition. So far, Newmarket has preserved over two per cent of their land mass, equivalent to 400,000 acres in Toronto. To date, the investment in environmental lands amounts to $3.0 million.

Partners for Naturally Green

Halton Region, along with representatives from the City of Burlington, the towns of Halton Hills, Milton, and Oakville, have joined forces to create Partners for Naturally Green. This group has developed a public education and awareness raising program, to inform the public about the potential risks of pesticide use and how to achieve fit lawns and gardens using natural methods instead of pesticides. As part of the education and awareness program, Partners for Naturally Green developed an annual pesticide exchange event, during which time the public is invited to exchange their old or unused pesticides for a pesticide reduction action kit. In 2004, the event drew visits from 1,868 vehicles, and resulted in the collection of 975 litres of pesticides. An informal survey conducted during the pesticide exchange event indicated that 85 per cent of the participants had not used pesticides on their lawn or garden. The Naturally Green program has also included extensive community outreach and a point of purchase program with a local retailer.

Green Roofs Program

In the fall of 2003, the Town of Markham submitted to council the results of a Green Roofs Feasibility Study for the installation of a green roof on the town's Civic Centre. The study was conducted in response to recommendations by the Town of Markham's Clean Air Working Group and the town's commitment at the 2002 Smog Summit. The Town of Markham is currently in the process of securing council approval and funding to enable this project to go forward.

At the 2004 Smog Summit, the City of Toronto announced that in partnership with CRESTech, it has received a $40,000 grant from the Federation of Canadian Municipalities Green Municipal Enabling Fund to undertake a study on 'Municipal Cost Savings Benefits of Green Roofs.' The study will assist the city in determining what actions the city might take to encourage more green roofs. Led by Toronto City Planning, the green roofs study will identify the environmental and social benefits of the development of green roofs, which include the reduced use of fossil fuels, the reduction of air pollution and greenhouse gas emissions and the mitigation of the urban heat island phenomenon. The City of Toronto has already developed several green roof projects including Mountain Equipment Co-Op, Roundhouse Park – Metro Convention Centre Parking Garage, the Sears Merchandise Lofts Building, the Manulife Centre, demonstration projects on the roof of Toronto's City Hall, and the Eastview Neighbourhood Community Centre.

EDUCATION/OUTREACH

Municipalities recognize the need to educate the public on current air quality issues and encourage community participation in air quality initiatives in order to make a substantial impact on the reduction of smog. Examples of local public awareness and outreach initiatives that are making a difference include:

Community Programs for Sensitive Populations

In an effort to offer relief from smog, the municipality of Clarington has implemented a Breathe Easy Program. On smog days, the municipality makes community centres and recreation facilities available free of charge for the elderly, the young and people experiencing respiratory problems. The program, in operation for three years, is advertised on local radio and has been relatively cost-effective given the benefits to sensitive populations.

Ensuring Public Access to Information

In Durham Region, public health inspectors from the Environmental Health Division of the Health Department are available during regular business hours to respond to public inquiries about smog and adverse health effects related to exposure to smog. In York Region, a "Health Connection" line has been established and smog alert toolkits are prepared and distributed to childcare centres, workplaces, and regional offices and are made available to the general public on the York Region Web site. Day cares and camps are also encouraged to reduce levels of exertion when a smog advisory has been issued. Toronto Health Connection provides a similar service connecting the public to programs and information available on smog and health in the City of Toronto. Other municipalities, such as Mississauga, have a recorded message for smog related inquires.

The Local Newspaper as a Medium for Public Awareness

Beginning in 2002, the Town of Markham's Clean Air Working Group – as part of their commitment to educating the local community on smog related issues – prepared a series of articles for the local newspaper. Featured topics included:

- Canada's Clean Air Day and identifying "clean air" choices the public could make;
- Promoting the annual Smog Summit, including a recap of Markham's commitments;
- Encouraging the community to participate in public Smog Summit related events;
- Highlighting the Town's development of a Corporate Smog Reduction Plan; and
- Identifying the link between air quality and health.

Curriculum-Based Programs

A local community group in Waterloo, the Citizens' Advisory Committee on Air Quality, worked with the local school board and Region of Waterloo Public Health to develop an Air Quality Lesson Plan for grade nine geography classes. As part of the lesson plan, students examine the causes of smog and its impact on human health and the health care system. Though the main focus of the lessons is smog in Ontario, they also touch upon smog in other parts of the world. The lessons attempt to teach students how they can reduce their contributions to smog, as well as give them an understanding of how the Air Quality Index works. The lesson plan also covers related topics such as links between air pollution and transportation, urban sprawl, energy and the environment, and acid rain.

The City of Ottawa, collaborating with the non-profit organization, Friends of the Earth, has developed a unique anti-idling program which targets elementary-school-aged children. The program includes visits from action heroes *Captain Oxygen* and *Dirty Airy*, outreach materials such as brochures and posters, curriculum-based classroom activities, recommendations for school-wide assembly games, copies of a *Captain Oxygen* and *Dirty Airy* comic book, copies of the book "Chester the Car", and tips on how to monitor success. The program is premised on the belief that if you work with children at a young age, the message will eventually get through to the adults more effectively.

The Ontario EcoSchools program includes 16 guides and three multi-media presentations on climate change to help school boards "green" their facilities and operation practices. This holistic provincial program situates the curriculum within the whole school context – its classrooms, offices, staff rooms, boiler rooms, and playgrounds. The '20/20 The Way to Clean Air' program extends the "energy conservation" component of EcoSchools into the homes of students by inviting families to participate in the energy savings activities outlined in the 20/20 EcoSchools Planner. During the 2003-2004 school year, 123 classrooms from 23 schools participated in this program and over 3,000 20/20 EcoSchools Planners were distributed to students and their families.

Active and Safe Routes to School

The York Region is one of the municipalities actively promoting the Active and Safe Routes to School program and the Walking School Bus. A Walking School Bus is when two or more families walk together to reduce traffic congestion, and promote safety and healthier lifestyles. York Region Health Services Department supports the Green Communities Active and Safe Routes to School Program by helping to promote the International Walk to School Day event to schools in York Region.

Messaging and Mascots

Peterborough has taken action to educate children about the importance of keeping the environment healthy and clean by supporting the creation of the Cool Climate Kids' Club, which was inspired by a letter-to-the-editor written by two grade six students. In the letter, the students explained their worries for the environment, and asked the general public to make small, environmentally-friendly changes in their everyday lives.

The Cool Climate Kids' Club was established for children across the County of Peterborough. The club's mascot, *Cool Captain Climate* visits local schools raising awareness about eco-friendly actions that everyone can take to help preserve a healthy environment. The Web site, www.coolclimate.org, provides information about climate change, its causes, and its effects and children can ask *Cool Captain Climate* questions about the environment.

Furthermore, the City of Peterborough (coordinated by Peterborough Green-Up), with support from the health unit and other funding partners, has developed peterboroughmoves.com, a Web site designed to provide area citizens with practical information and tools to engage in or expand their participation in active forms of transportation and ridesharing.

SECTION 4: THE SCIENCE OF SMOG

SMOG CONSTITUENTS AND THEIR CHARACTERISTICS

The term 'smog' is used to describe a mixture of pollutants, primarily made up of ozone and fine particulate matter ($PM_{2.5}$). Elevated levels of this mixture deteriorate air quality, impacting human and ecological health. Recent health and scientific research on these two major smog constituents has resulted in further government initiatives, at all levels, to reduce emissions and develop information tools to inform and protect the public. The awareness of these impacts is on the rise, bringing smog to the forefront of environmental concerns.

In Ontario, smog episodes have traditionally been observed during the months of May through September. The recent inclusion of $PM_{2.5}$ to the ministry's Air Quality Index (AQI) enables the possibility of smog episodes outside of this traditional smog season, therefore allowing the monitoring and reporting of smog year-round. Meteorological conditions also play a significant role in the development of widespread, persistent, and elevated smog levels.

Table 4.1 identifies general human health and ecological effects of the most common smog constituents:

Table 4.1: Summary of Pollutant Characteristics, Sources and General Health and Ecological Effects

POLLUTANT	CHARACTERISTICS	SOURCES	ONTARIO AMBIENT AIR QUALITY CRITERIA (AAQC)	GENERAL HEALTH EFFECTS	GENERAL ECOLOGICAL EFFECTS
Ozone (O_3)	A colourless gas with a strong smell. Major component of summer smog.	Ozone is not emitted directly into the atmosphere. It is produced by the photochemical action of nitrogen oxides and volatile organic compounds.	1 h average 80 ppb	Irritation of the lungs and difficulty in breathing. Exposure to high concentrations can result in chest tightness, coughing and wheezing.	Damage to agricultural crops, ornamentals, forests and natural vegetation.
Fine Particulate Matter ($PM_{2.5}$)*	Mixture of solid particles and liquid droplets in the air. Major component of summer and winter smog.	$PM_{2.5}$ is primarily formed from chemical reactions in the atmosphere and through fuel combustion.		Aggravation of existing heart and lung diseases and can exacerbate symptoms such as chest pain, shortness of breath, wheezing and fatigue.	Damage to agricultural crops and vegetation. Major cause of visibility impairment. Damage and soiling of building materials.
Sulphur Dioxide (SO_2)	Colourless gas with a strong odour similar to burnt matches.	Sources of SO_2 include: electric utilities and non-ferrous smelters. Also primary metal processing, iron ore smelters, pulp and paper, petroleum refineries, etc.	1 h average 250 ppb 24 h average 100 ppb 1 y average 20 ppb	Breathing discomfort, respiratory illness, aggravation of exisiting respiratory and cardiovascular disease. People with asthma, chronic lung or heart disease are most sensitive to SO_2.	Leads to acid deposition, which causes lake acidification, corrosion and haze. Damage to tree leaves and crops.
Nitrogen Dioxide (NO_2)	Gas with a pungent and irritating odour. A precursor to O_3	Sources of NO_2 include: automobiles, thermal power plants, incineration, etc. Natural sources include lightning and soil bacteria.	1 h average 200 ppb	Increasing sensitivity for people with asthma and bronchitis.	Leads to acid deposition and adverse effects on vegetation.
Carbon Monoxide (CO)	Colourless, odourless, tasteless and poisonous gas.	Major source is transportation sector, i.e. road vehicles, aircraft and railways.	1 h average 30 ppm 8 h average 13 ppm	Impairment of visual perception, work capacity, learning ability and performance of complex tasks.	

** The $PM_{2.5}$ reference level is 30 μg/m³ over a 24-hour period (based on Canada-wide Standards) and 45 μg/m³ over a 3-hour period (equivalence).*

Ground-Level Ozone (O_3)

Ground-level ozone (O_3) is a colourless, odourless gas at ambient concentrations, and is a major component of smog. It is formed when nitrogen oxides (NO_X) and volatile organic compounds (VOCs) react in the presence of sunlight. While the naturally occurring ozone in the stratosphere shields the earth from harmful ultraviolet solar radiation, ozone at ground-level is a major environmental and health concern.

SECTION 4: THE SCIENCE OF SMOG

SMOG CONSTITUENTS AND THEIR CHARACTERISTICS

The term 'smog' is used to describe a mixture of pollutants, primarily made up of ozone and fine particulate matter ($PM_{2.5}$). Elevated levels of this mixture deteriorate air quality, impacting human and ecological health. Recent health and scientific research on these two major smog constituents has resulted in further government initiatives, at all levels, to reduce emissions and develop information tools to inform and protect the public. The awareness of these impacts is on the rise, bringing smog to the forefront of environmental concerns.

In Ontario, smog episodes have traditionally been observed during the months of May through September. The recent inclusion of $PM_{2.5}$ to the ministry's Air Quality Index (AQI) enables the possibility of smog episodes outside of this traditional smog season, therefore allowing the monitoring and reporting of smog year-round. Meteorological conditions also play a significant role in the development of widespread, persistent, and elevated smog levels.

Table 4.1 identifies general human health and ecological effects of the most common smog constituents:

Table 4.1: Summary of Pollutant Characteristics, Sources and General Health and Ecological Effects

POLLUTANT	CHARACTERISTICS	SOURCES	ONTARIO AMBIENT AIR QUALITY CRITERIA (AAQC)	GENERAL HEALTH EFFECTS	GENERAL ECOLOGICAL EFFECTS
Ozone (O_3)	A colourless gas with a strong smell. Major component of summer smog.	Ozone is not emitted directly into the atmosphere. It is produced by the photochemical action of nitrogen oxides and volatile organic compounds.	1 h average 80 ppb	Irritation of the lungs and difficulty in breathing. Exposure to high concentrations can result in chest tightness, coughing and wheezing.	Damage to agricultural crops, ornamentals, forests and natural vegetation.
Fine Particulate Matter ($PM_{2.5}$)*	Mixture of solid particles and liquid droplets in the air. Major component of summer and winter smog.	$PM_{2.5}$ is primarily formed from chemical reactions in the atmosphere and through fuel combustion.		Aggravation of existing heart and lung diseases and can exacerbate symptoms such as chest pain, shortness of breath, wheezing and fatigue.	Damage to agricultural crops and vegetation. Major cause of visibility impairment. Damage and soiling of building materials.
Sulphur Dioxide (SO_2)	Colourless gas with a strong odour similar to burnt matches.	Sources of SO_2 include: electric utilities and non-ferrous smelters. Also primary metal processing, iron ore smelters, pulp and paper, petroleum refineries, etc.	1 h average 250 ppb 24 h average 100 ppb 1 y average 20 ppb	Breathing discomfort, respiratory illness, aggravation of exisiting respiratory and cardiovascular disease. People with asthma, chronic lung or heart disease are most sensitive to SO_2.	Leads to acid deposition, which causes lake acidification, corrosion and haze. Damage to tree leaves and crops.
Nitrogen Dioxide (NO_2)	Gas with a pungent and irritating odour. A precursor to O_3	Sources of NO_2 include: automobiles, thermal power plants, incineration, etc. Natural sources include lightning and soil bacteria.	1 h average 200 ppb	Increasing sensitivity for people with asthma and bronchitis.	Leads to acid deposition and adverse effects on vegetation.
Carbon Monoxide (CO)	Colourless, odourless, tasteless and poisonous gas.	Major source is transportation sector, i.e. road vehicles, aircraft and railways.	1 h average 30 ppm 8 h average 13 ppm	Impairment of visual perception, work capacity, learning ability and performance of complex tasks.	

** The $PM_{2.5}$ reference level is 30 μq/m^3 over a 24-hour period (based on Canada-wide Standards) and 45 μg/m^3 over a 3-hour period (equivalence).*

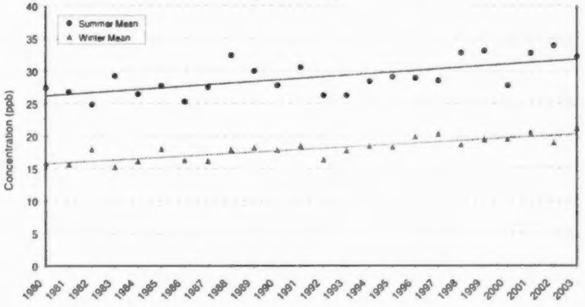
Ground-Level Ozone (O_3)

Ground-level ozone (O_3) is a colourless, odourless gas at ambient concentrations, and is a major component of smog. It is formed when nitrogen oxides (NO_X) and volatile organic compounds (VOCs) react in the presence of sunlight. While the naturally occurring ozone in the stratosphere shields the earth from harmful ultraviolet solar radiation, ozone at ground-level is a major environmental and health concern.

Ground-level ozone is typically a by-product of human activities. With increasing populations, more automobiles, and more industry, levels of ground-level ozone is on the rise. Although local emissions play a role in these elevated O_3 levels, a major portion of Ontario's smog is a direct result of emissions originating in the United States.

The formation and transport of ground-level ozone are strongly dependent on meteorological conditions. Changing weather patterns contribute to short-term and year-to-year differences in ozone concentrations. In Ontario, elevated concentrations of ground-level ozone are generally recorded on hot, sunny days from May to September, between noon and early evening.

Figure 4.1
Trend of Ozone Seasonal Means at Sites Across Ontario
(1980 - 2003)



Note: Based on data from 17 ozone sites operated over 24 years;
Seasonal definitions - Summer (May to September); Winter (January to April, October to December).

The trend of the ozone seasonal means (summer and winter) for 17 long-term ozone sites across Ontario for the period 1980 to 2003 is shown in Figure 4.1. It shows that there has been an increasing trend in the ozone seasonal means during the 24-year period. The ozone summer means have increased by approximately 21 per cent and the winter means by approximately 29 per cent over the 24-year period. The increasing trends of the summer and winter ozone means are largely related to increases in global background concentrations of ozone throughout Ontario. Additional contribution to the increased trends in the summer may be related to meteorological factors and long-range transport of ozone and its precursors from the United States. It is worth noting, however, that the maximum one-hour ozone concentrations have decreased from 1980 to 2003.

By recognizing these trends and identifying sources of ozone precursors as those produced by human activities, it is up to all Ontarians to do their part in taking effective action to ensure that elevated ozone levels are experienced less frequently in the future.

Associated Health and Ecological Effects

Ground-level ozone has been linked to health deficiencies including reduced lung capacity in healthy adults and children, and increased respiratory infections such as bronchitis and pneumonia, as well as increased hospitalizations for asthma and lung disease. There is also evidence that excessive exposure to ozone can heighten sensitivity of asthma sufferers to other common airborne allergens.

In 2000, the Canadian Council of Ministers of the Environment (CCME) developed a Canada-wide Standard (CWS) as a result of the pollutant's adverse effects on human health and the environment. The CWS for ozone is 65 ppb, 8-hour running average time, based on the 4th highest annual ambient measurement averaged over three consecutive years. Jurisdictions are required to meet the CWS for ozone by 2010. This standard will typically be more stringent than the Ontario ambient air quality criterion (AAQC) of 80 ppb averaged over 1-hour.

Ground-level ozone is also one of the atmosphere's most damaging pollutants to the environment. Ontario's environmental objective for ozone is set at a level designed to protect the most sensitive crops from visible leaf damage. However, minimal exposure to even the lowest concentrations can reduce the yield of some crops and stunt tree growth. Cumulative exposure to ozone throughout the growing season is believed to cause significant harm to Ontario's agricultural and forest industries. Ozone can also damage synthetic materials – causing cracks in rubber, accelerating the fading of dyes, speeding up the deterioration of some paints and coatings, and affecting cotton, acetate, nylon, polyester and other fabrics.

Fine Particulate Matter ($PM_{2.5}$)

Airborne particulate matter is the general term used to describe a mixture of microscopic solid particles suspended in air. Particulate matter is characterized according to its aerodynamic size – mainly because of the different health effects associated with particles of different diameters. Fine particulate matter (or respirable particles) refers to particles that are 2.5 microns in diameter and less that may penetrate deep into the respiratory system.

Particles originate from many anthropogenic sources such as industries and transportation, as well as natural sources. Primary particulate matter may be emitted directly from combustion and non-combustion sources such as motor vehicles, power generation, industrial facilities, residential fireplaces and wood stoves, agricultural burning and forest fires. Other primary sources include open sources such as construction activity, agricultural activity and road dust. Particulate matter may also be formed in the atmosphere by the transformation of gaseous emissions (secondary). Secondary particles such as sulphates, nitrates and organic carbon are formed in the atmosphere from precursor gases such as sulphur dioxide (SO_2), NO_X, VOCs, and ammonia (NH_3).

Particulate matter includes aerosols, smoke, fumes, dust, fly ash and pollen. Its composition varies with origin, residence time in the atmosphere, time of year and environmental conditions.

Significant amounts (more than 50 per cent) of $PM_{2.5}$ measured in southern Ontario are of transboundary origin. Despite this large contribution from our neighbours, local emission problems are still present within Ontario and it is our onus to take effective action in reducing these emissions.

Natural phenomena can also contribute to elevated levels of $PM_{2.5}$ during events such as forest fires and volcanic eruptions. These natural events can produce extremely high levels of particulate matter of various sizes, which can be detrimental to both human and ecological health. The Quebec Forest Fires of July 2002 created a huge plume of smoke that impacted areas in the eastern parts of North America as well as the most southern parts of Ontario. The fire contained a mixture of pollutants, of which particulate matter was a major constituent. Air quality readings of $PM_{2.5}$ during this smog episode were in the "very poor" range at a number of sites across southern and eastern Ontario, including the GTA, Peterborough and Ottawa.

Associated Health and Ecological Effects

Fine particulate matter can penetrate deeply into the lungs, impacting all people, especially those individuals who have existing respiratory and cardiovascular diseases. Exposure to $PM_{2.5}$, for even the shortest duration, can exacerbate symptoms in these individuals, while long-term exposure has been linked to an increased risk of cardiovascular mortality. With recent developments in research linking adverse health and environmental effects to $PM_{2.5}$, the CCME introduced the new CWS for $PM_{2.5}$. The CWS for $PM_{2.5}$ is 30 $\mu g/m^3$, 24-hour averaging time, based on the 98th percentile annual ambient measurement averaged over three years. Jurisdictions are required to meet the CWS by 2010.

Ultra-fine particles prevalent in vehicle exhaust emissions are also of particular concern as the diminutive size of these particles (< 0.1 µm) could potentially cause severe detrimental effects to public health and the environment. Recent scientific studies have demonstrated that ultra-fine particles are highly toxic and capable of producing considerable respiratory tissue inflammation on exposure.

In addition to human health impacts, $PM_{2.5}$ can also cause corrosion, soiling and damage of vegetation. The most significant environmental impact due to elevated particulate matter is the deterioration of visibility in the form of regional haze. A haze can be seen over many cities in Ontario during the worst smog days.

MAJOR PRECURSORS OF SMOG

Volatile Organic Compounds (VOCs)

Smog precursors are emitted from day-to-day activities such as driving automobiles and using air conditioners and can expand to include more specific activities such as, industrial processes in power plants and commercial boilers. Most of these smog-producing air pollutants are released as unburned by-products of gasoline and natural gas. They can also be produced through the evaporation of liquid fuels, and in the use of solvents and other volatile products, such as oil-based paints, known as volatile organic compounds (VOCs). VOCs contribute to the formation of ozone and $PM_{2.5}$ and are emitted into the atmosphere from a variety of anthropogenic sources, including vehicles and fossil fuel combustion.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide (NO_2) is a reddish-brown gas with a pungent and irritating odour, which transforms in the air to form gaseous nitric acid and nitrates. It also plays a major role in atmospheric reactions that produce ground-level ozone, a major component of smog. Nitrogen dioxide is also a precursor to nitrates, which contribute to levels of fine particulate matter in the atmosphere. All combustion in air produces nitrogen oxides (NO_X), of which NO_2 is a significant component. Major sources of NO_X emissions include the transportation sector, fossil fuel power generation, primary metal production and incineration.

Nitrogen dioxide can irritate the lungs lowering the resistance to respiratory infection. People with asthma and bronchitis have increased sensitivity to this precursor. Further, nitrogen dioxide chemically transforms into nitric acid in the atmosphere and, when deposited, contributes to lake acidification. Nitric acid can also corrode metals, fade fabrics, degrade rubber, and damage trees and crops.

Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) is a colourless gas that smells like burnt matches, and can be oxidized to form sulphuric acid aerosols. In addition, SO_2 is a precursor to sulphates, which are one of the main components of airborne fine particulate matter.

Sulphur dioxide is emitted into the atmosphere from sources such as smelters, utilities, iron and steel mills, petroleum refineries, and pulp and paper mills. Lesser sources include transportation, residential, commercial and industrial space heating. The highest peak concentrations of SO_2 historically have been recorded in the vicinity of large industrial facilities.

Health effects caused by exposure to high levels of SO_2 include breathing problems, respiratory illness, changes in the lung's defences, and worsening respiratory and cardiovascular disease. People with asthma, chronic lung disease or heart disease are the most sensitive to SO_2. Sulphur dioxide also damages trees and crops, and contributes to the acidification of lakes and streams. SO_2 also accelerates the corrosion of buildings and reduces visibility, as well as causes the formation of microscopic acid aerosols, which have serious health implications and contribute to climate change.

Ammonia (NH_3)

Ammonia is a colourless gas with a characteristic pungent smell at standard temperature and pressure. One of the most characteristic properties of ammonia is its power of combining directly with acids to form salts. In the atmosphere it is a significant precursor gas of smog yielding ammonium sulphates and nitrate species. Ammonia is extensively used to manufacture fertilizers and a wide variety of nitrogen-containing organic and inorganic chemicals.

Carbon Monoxide (CO)

Carbon monoxide (CO) is a colourless, odourless, tasteless and, at high concentrations, poisonous gas. CO is produced primarily by the incomplete combustion of fossil fuels. The transportation sector is the main source of CO emissions. Carbon monoxide is a minor precursor to regional ozone formation but can be significant on a global scale.

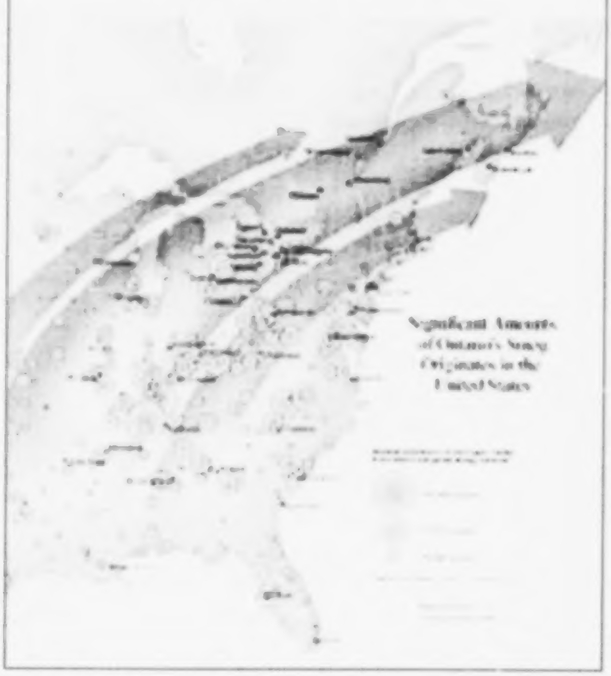
At high concentrations, CO can enter the bloodstream and reduce oxygen delivery to the organs and tissues. People with heart disease are particularly sensitive. Exposure to high CO levels is linked with the impairment of vision, work capacity, learning ability and performance of complex tasks.

SMOG AND GEOGRAPHY

Ontario's highest smog levels are typically observed in the southwestern and south central parts of the province, due to both local pollution sources and smog generated in the United States. Certain areas in these parts of Ontario are located downwind of U.S. industrial sources as depicted in Figure 4.2. Meteorological conditions favour polluted air masses to move northeast from the United States over the Great Lakes. This allows ozone precursors, NO_X and VOCs, to react in the presence of sunlight, resulting in elevated ozone concentrations in the province. These conditions also allow for fine particles to travel northeast, and consequently increase $PM_{2.5}$ levels in Ontario.

During widespread smog episodes, it is estimated that more than 50 per cent of ozone and fine particulate matter in Ontario are due to the long-range transport of these pollutants and their precursors from neighbouring U.S. states. The contribution of the United States is expected to be much higher (as much as 90 per cent) in Ontario cities and towns on the northern shores of Lake Erie, the eastern shores of Lake Huron and in the extreme southwest near the United States border.

Figure 4.2
Transboundary Air Flow into Ontario


Significant Amounts of Ontario's Smog Originates in the United States

Smog precursors emitted from motor vehicles and industrial facilities in the Ohio valley can travel to southern Ontario communities. In the same way, Quebec and Atlantic Canada are sometimes the downwind recipients of pollutants that are emitted from sources including Ontario's vehicles and power plants.

SMOG AND METEOROLOGY

Smog episodes are highly dependent upon meteorological conditions which vary from year to year. Figure 4.3 shows the distribution of the province-wide ozone exceedance days (at least one hour > 80 ppb) and the number of hot days (those days with maximum air temperatures greater than 30°C) from 1990 to 2003. The high number of ozone exceedance days in 1991, 1998, 1999, 2001 and 2002 can be largely attributed to the relatively high number of "hot" days which are favourable to the formation and transport of ozone, whereas the low numbers of exceedance days in 2000 reflect conditions less conducive to the production of ground-level ozone.

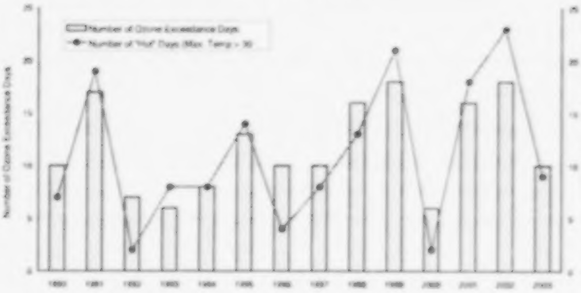


Figure 4.3
Trend for Ozone Exceedance Days and 'Hot' Days in Ontario
(1990 - 2003)

Note: Based on 21 ozone sites operated over 14 years.
'Hot' days based on eight meteorological sites operated over 14 years.
An ozone exceedance day has at least one hour > 80 ppb.

In contrast, fine particulate matter levels can be elevated at any time throughout the year. Typically, elevated levels are observed during the weekdays when traffic and industrial processes are most active. However, the right weather conditions can be conducive to the formation and persistence of particulate matter.

Temperature inversions and other climatic conditions can trap stagnant, smoggy air over a region for days at a time. Figure 4.4a depicts the normal temperature pattern and Figure 4.4b depicts temperature inversion. If a parcel of air is cooler than its surroundings it will sink; if it is warmer, it will continue to rise.

Historically, smog days were reported only during the summer months when ozone levels tend to build. With the recent monitoring and reporting of fine particulate matter, smog days are now be reported at any time throughout the year.

Figure 4.4a – Normal Temperature Pattern

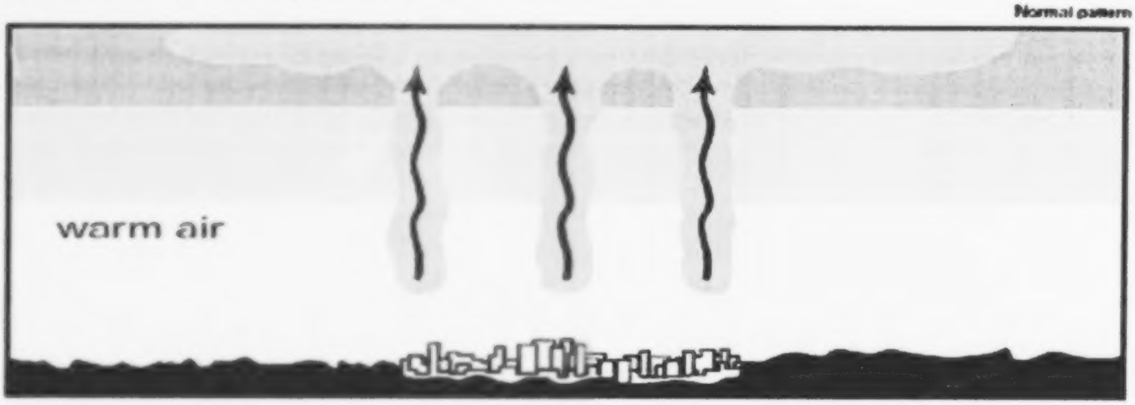
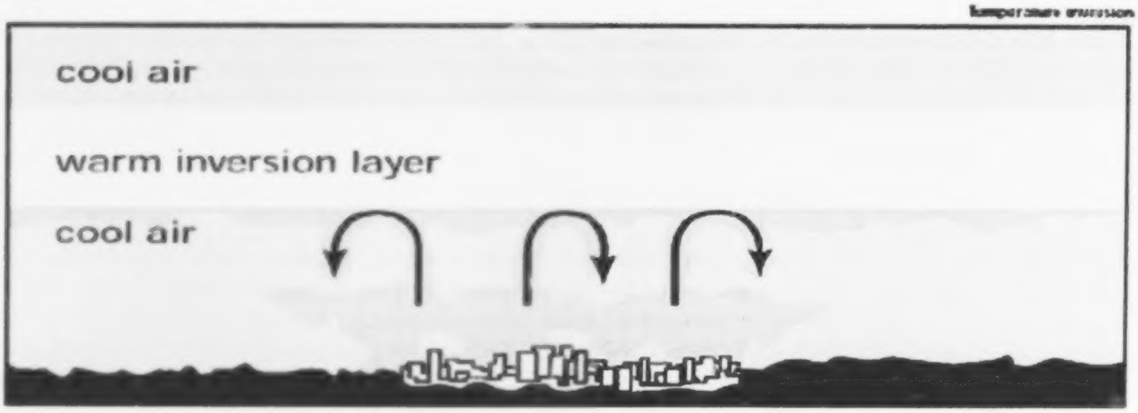


Figure 4.4b – Temperature Inversion

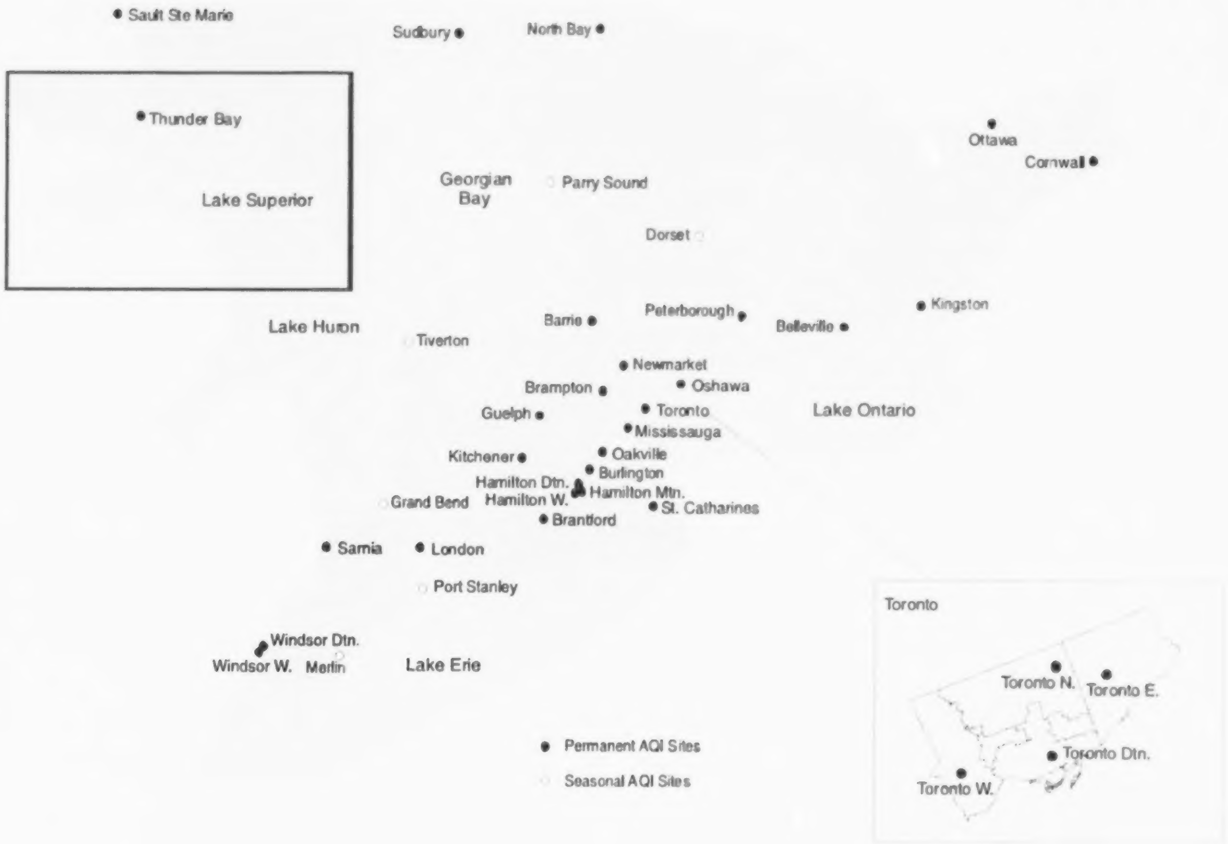


MONITORING AND REPORTING OF SMOG IN ONTARIO

The Air Quality Index (AQI) and Monitoring Network

The Ministry of the Environment operates an extensive network of air quality monitoring sites across the province as depicted in Figure 4.5. In 2003, 37 of these sites in 24 urban centres and seven rural areas formed the basis of the Air Quality Index (AQI) network. The Air Quality Office of the Environmental Monitoring and Reporting Branch continually obtains data for several criteria pollutants from these 37 sites.

Figure 4.5
Air Quality Index Monitoring Sites in Ontario
(2004)


Sault Ste Marie
Sudbury
North Bay
Thunder Bay
Lake Superior
Georgian Bay
Parry Sound
Dorset
Ottawa
Cornwall
Kingston
Lake Huron
Tiverton
Barrie
Peterborough
Belleville
Newmarket
Brampton
Oshawa
Guelph
Toronto
Lake Ontario
Mississauga
Kitchener
Oakville
Burlington
Hamilton Dtn.
Hamilton W.
Hamilton Mtn.
Grand Bend
St. Catharines
Brantford
Sarnia
London
Port Stanley
Windsor Dtn.
Windsor W.
Merlin
Lake Erie
Permanent AQI Sites
Seasonal AQI Sites
Toronto
Toronto N.
Toronto E.
Toronto Dtn.
Toronto W.

The AQI network provides the public with air quality information, in near real-time, from across the province. The AQI is based on pollutants that have adverse effects on human health and the environment. These pollutants include: ozone (O_3), fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO), sulphur dioxide (SO_2), and total reduced sulphur (TRS) compounds. At the end of each hour, the concentration of each pollutant measured at a particular site is converted into a number ranging from 1 upwards using a common scale or index. The calculated number for each pollutant is called a sub-index.

At a given site, the highest sub-index for any given hour becomes the AQI reading. The index is a relative scale, in that, the lower the index, the better the air quality. The index values, corresponding categories and potential health and environmental effects, are shown in Table 4.2.

Table 4.2: Air Quality Index Pollutants and Their Impacts

Index	Category	Ozone (O_3)	Fine Particulate Matter ($PM_{2.5}$)	Nitrogen Dioxide (NO_2)	Carbon Monoxide (CO)	Sulphur Dioxide (SO_2)	Total Reduced Sulphur (TRS) Compounds
1-15	Very good	No health effects are expected in healthy people	Sensitive populations may want to exercise caution	No health effects are expected in healthy people	No health effects are expected in healthy people	No health effects are expected in healthy people	No health effects are expected in healthy people
16-31	Good	No health effects are expected in healthy people	Sensitive populations may want to exercise caution	Slight odour	No health effects are expected in healthy people	Damages some vegetation in combination with ozone	Slight odour
32-49	Moderate	Respiratory irritation in sensitive people during vigorous exercise; people with heart/lung disorders at some risk; damages very sensitive plants	People with respiratory disease at some risk	Odour	Blood chemistry changes, but no noticeable impairment	Damages some vegetation	Odour
50-99	Poor	Sensitive people may experience irritation when breathing and possible lung damage when physically active; people with heart/lung disorders at greater risk; damages some plants	People with respiratory disease should limit prolonged exertion; general population at some risk	Air smells and looks brown. Some increase in bronchial reactivity in people with asthma	Increased symptoms in smokers with heart disease	Odourous; increasing vegetation damage	Strong odour
100 and over	Very poor	Serious respiratory effects, even during light physical activity; people with heart/lung disorders at high risk; more vegetation damage	Serious respiratory effects even during light physical activity; people with heart disease, the elderly and children at high risk; increased risk for general population	Increasing sensitivity for people with asthma and bronchitis	Increasing symptoms in non-smokers with heart diseases; blurred vision; some clumsiness	Increasing sensitivity for people with asthma and bronchitis	Severe odour; some people may experience nausea and headaches

** Please note that the information in this table will be reviewed and may change.*

Computed air quality indices, or AQI values, and air quality forecasts are released to the public and news media at set times each day. The public can access the index values by calling the ministry's air quality information Integrated Voice Response (IVR), English recording: 1-800-387-7768, or in Toronto, 416-246-0411, and French recording: 1-800-221-8852. The AQI values can also be obtained from the ministry's Web site: www.airqualityontario.com. Air quality forecasts, based on regional meteorological conditions and current pollution levels in Ontario and bordering U.S. states, are also provided daily on this Web site.

On average, the AQI sites in 2003 reported air quality in the good and very good categories approximately 90 per cent of the time and moderate to poor air quality about 10 per cent of the time. Ozone and fine particulate matter – the main drivers of smog – were responsible for the highest percentage of valid hours that exceeded the poor AQI threshold.

At a given site, the highest sub-index for any given hour becomes the AQI reading. The index is a relative scale, in that, the lower the index, the better the air quality. The index values, corresponding categories and potential health and environmental effects, are shown in Table 4.2.

Table 4.2: Air Quality Index Pollutants and Their Impacts

Index	Category	Ozone (O_3)	Fine Particulate Matter ($PM_{2.5}$)	Nitrogen Dioxide (NO_2)	Carbon Monoxide (CO)	Sulphur Dioxide (SO_2)	Total Reduced Sulphur (TRS) Compounds
1-15	Very good	No health effects are expected in healthy people	Sensitive populations may want to exercise caution	No health effects are expected in healthy people	No health effects are expected in healthy people	No health effects are expected in healthy people	No health effects are expected in healthy people
16-31	Good	No health effects are expected in healthy people	Sensitive populations may want to exercise caution	Slight odour	No health effects are expected in healthy people	Damages some vegetation in combination with ozone	Slight odour
32-49	Moderate	Respiratory irritation in sensitive people during vigorous exercise; people with heart/lung disorders at some risk; damages very sensitive plants	People with respiratory disease at some risk	Odour	Blood chemistry changes, but no noticeable impairment	Damages some vegetation	Odour
50-99	Poor	Sensitive people may experience irritation when breathing and possible lung damage when physically active; people with heart/lung disorders at greater risk; damages some plants	People with respiratory disease should limit prolonged exertion; general population at some risk	Air smells and looks brown. Some increase in bronchial reactivity in people with asthma	Increased symptoms in smokers with heart disease	Odourous; increasing vegetation damage	Strong odour
100 and over	Very poor	Serious respiratory effects, even during light physical activity; people with heart/lung disorders at high risk; more vegetation damage	Serious respiratory effects even during light physical activity; people with heart disease, the elderly and children at high risk; increased risk for general population	Increasing sensitivity for people with asthma and bronchitis	Increasing symptoms in non-smokers with heart diseases; blurred vision; some clumsiness	Increasing sensitivity for people with asthma and bronchitis	Severe odour; some people may experience nausea and headaches

** Please note that the information in this table will be reviewed and may change.*

Computed air quality indices, or AQI values, and air quality forecasts are released to the public and news media at set times each day. The public can access the index values by calling the ministry's air quality information Integrated Voice Response (IVR), English recording: 1-800-387-7768, or in Toronto, 416-246-0411, and French recording: 1-800-221-8852. The AQI values can also be obtained from the ministry's Web site: www.airqualityontario.com. Air quality forecasts, based on regional meteorological conditions and current pollution levels in Ontario and bordering U.S. states, are also provided daily on this Web site.

On average, the AQI sites in 2003 reported air quality in the good and very good categories approximately 90 per cent of the time and moderate to poor air quality about 10 per cent of the time. Ozone and fine particulate matter – the main drivers of smog – were responsible for the highest percentage of valid hours that exceeded the poor AQI threshold.

The Provincial Smog Alert Program

The ministry began issuing smog advisories in 1993 under the Air Quality Advisory program. The program was revised in 1995, and then expanded to the Smog Alert Program in 2000. The program, a joint effort between the Ontario Ministry of the Environment and Environment Canada, is a two-tiered program that notifies the public of deteriorating air quality through the issuance of smog watches and smog advisories.

A Smog Watch is called when there is a 50 per cent chance that elevated smog levels are forecast within the next three days. A Smog Advisory is issued when there is a strong likelihood that elevated smog levels are forecast within the next 24 hours. An advisory can also be issued immediately if widespread, elevated smog levels occur without warning and weather conditions conducive to the persistence of such levels are forecast to continue for several hours.

This Smog Alert program is built on the existing AQI where exceedances of provincial criteria or critical levels are monitored and reported. For example, on days when ozone is expected to be widespread, persistent, and exceeds the 1-hour Ontario Ambient Air Quality Criterion (AAQC) of 80 ppb, a smog advisory will be issued for the impacted region(s).

The public is notified of smog advisories through media outlets such as television and radio weather forecasts either immediately or the day prior to an expected smog episode. This allows Ontarians to take the necessary precautions to protect their health and warns major pollution sources that they may need to reduce their emissions. Advisories are also provided through the Web sites www.ene.gov.on.ca and www.airqualityontario.com, as well as the automated telephone service. In addition, the ministry now offers an electronic smog notification system for individuals who wish to subscribe to this service. Subscribers are notified by e-mail when smog advisories are issued, extended and terminated.

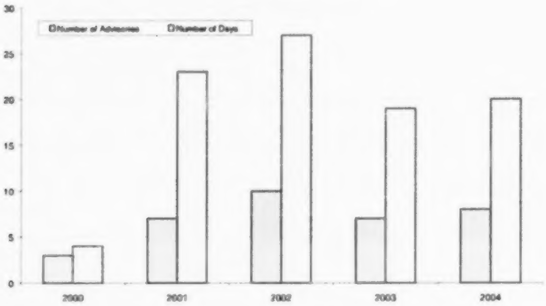


Figure 4.6
Summary of Smog Advisories Issued
(2000 - 2004)

For the 2004 traditional smog season (May 1 to September 30), Ontarians experienced seven smog advisories covering 18 days. Outside of the traditional smog season, a two-day smog advisory due to $PM_{2.5}$ was issued for Hamilton on October 26 and 27, 2004, bringing the provincial total to eight smog advisories, covering 20 days in 2004. This is the second time a smog advisory was issued outside of the traditional smog season. An advisory due to $PM_{2.5}$ was also issued for Hamilton on October 10 and 11, 2003.

For the province as a whole, there were 23 smog advisory days in 2001 and a record 27 days in 2002. Near seasonal weather conditions prevailed over much of southern Ontario during the summers of 2003 and 2004 and this was reflected in a lower number of smog advisory days than that of the previous two years, which had summers that were relatively hot and dry. In contrast, the cool and wet summer of 2000 had only four smog advisory days for the entire province. A history of smog advisories and smog advisory days since 2000 is shown in Figure 4.6.

Co-operative Activities with Michigan and Quebec

Since May 2000, air quality and meteorological discussions between Michigan and Ontario meteorologists are held twice per week or more frequently if there is potential for a smog advisory in Ontario or an ozone action day in Michigan during the traditional smog season. Although ozone action days in Michigan and smog advisories in Ontario are not linked to the same air quality standards, the weather conditions conducive to high levels of smog are often common to both airsheds, particularly in the Detroit-Windsor airshed.

The issuances of smog advisories in Ontario and in Quebec under the Info-Smog program during the smog season are also harmonized through discussions, when required, between Ontario and Meteorological Services of Canada Quebec Region meteorologists for border regions such as Ottawa, Ontario and Gatineau, Quebec.

The Smog Alert Response Program (SARP)

The Ministry of the Environment is also responsible for the Smog Alert Response Program (SARP), which assists government ministries, Ontario municipalities and private sector organizations in playing an effective role in disseminating smog information and alerts, encouraging actions to reduce air pollutants that cause smog, and generally increases public awareness around this issue.

SECTION 5: SAMPLE MUNICIPAL OPERATIONAL PLAN

The following section outlines examples of operational procedures and actions that may be taken by municipalities when a smog advisory is issued. Please note that this is not a comprehensive list and not all actions/responses will be feasible in all municipalities. The material may also not be relevant to those municipalities with existing, clearly defined operational procedures. These tables are merely intended to be used as a repository of actions from which municipalities may select those applicable, if they consider it relevant.

These tables may be used by municipalities as a basis for the development of an operational plan which may be part of the official smog alert response plan or a related supporting document. Some municipalities may intend this material for internal use only while others may be comfortable with disseminating this information to the public. For our purposes, these procedures and actions have been grouped according to "General Municipal Actions" and "Department/Division-Specific Actions." We have listed the actions according to the response required, the lead in carrying out the response and an additional column for comments as needed. Municipalities could also use this type of table for an evaluation of actions taken by simply adding a status or results column to the tables.

GENERAL MUNICIPAL ACTIONS

Response	Lead	Comments
Notify all municipal employees of smog advisory, as well as disseminate relevant smog-related information.	Air Quality Coordinator/Air Quality Committee/Communications	See Section 1 for more information on notification processes.
Suspend or reduce the use of non-essential motor vehicle use. Encourage the use of public transit, where available, or alternative transportation; delay deliveries and errands; schedule teleconferences; for essential vehicle use, give priority to alternative fuel or zero emissions vehicles.	All municipal employees, contractors, and the public and private sectors.	This will help to reduce the amount of emissions contributing to air pollution.
Minimize vehicle idling.	All municipal employees, contractors, and the public and private sectors.	This will help to reduce the amount of emissions contributing to air pollution.
Increase air conditioning temperatures one or two degrees Celsius to reduce the energy requirements.	Facilities staff and the public and private sectors.	
Implement a casual dress code during the summer months to reduce the energy requirement of air conditioning.	All municipal employees, contractors, and the public and private sectors.	
Suspend or reduce the use of air conditioning in vehicles.	All municipal employees, contractors, and the public and private sectors.	
Encourage turning off lights, computers and monitors when not in use.	All municipal employees, contractors, and the public and private sectors.	

Suspend or reduce strenuous outdoor work or exercise.	All municipal employees, contractors, and the public and private sectors.	To reduce adverse health effects. Prepare a list of alternative work options for employees working outdoors.
Develop smog related informational/promotional material.	Air Quality Coordinator/Air Quality Committee	
Discourage refueling between 9 a.m. and 3 p.m.	Senior management	
Incorporate the use of biodiesel into the municipal fleet and equipment used for grounds maintenance.	Senior management	Biodiesel burns cleaner than gas, emitting less harmful compounds into the air.

DEPARTMENT/DIVISION SPECIFIC ACTIONS

Communications

Response	Lead	Comments
Notify all municipal employees of smog advisory, as well as disseminate relevant smog-related information.	Air Quality Coordinator	See Section 1 for more information on notification processes.
Implement and update smog hotline and Web site to provide information, advise and referrals regarding the smog advisory and appropriate actions.	Air Quality Coordinator/Air Quality Committee	
Implement and update hotline for weekend staff.	Air Quality Coordinator	Reduces resource requirement.
Notify sensitive populations (children, the elderly, and those suffering from cardiac and respiratory problems) of smog advisory and actions they can take to protect themselves.	Air Quality Coordinator	This could be done through press releases or by setting up an external notification process. See Section 2 for more information.
Notify municipal daycares, day camps, senior centres and school boards and encourage them to suspend or reduce outdoor activities.	Air Quality Coordinator	Could use an external notification process to accomplish this.
Issue press/media releases to inform the public of smog advisories and other relevant information.	Air Quality Coordinator	
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	

Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	
Place anti-idling signs at schools and municipal buildings.	Key departmental/divisional contacts or supervisors	To reduce exposure to vehicle exhaust.

Operations/Parks and Recreation/Public Works

Response	Lead	Comments
Suspend or reduce the use of gasoline-powered equipment (including lawn mowers, trimmers, leaf blowers, and chainsaws.	Key departmental/divisional contacts, supervisors, and municipal contractors	Some municipalities prepare a list of alternative work options, such as hand raking baseball diamonds and picnic areas; hand weeding shrub/ flower beds; litter removal from natural areas, woodlots and creeks; graffiti removal using water-based paints and chemicals; removal of dead trees, etc.
Suspend gasoline refueling, if possible, otherwise delay essential refueling until the evening or early morning hours.	Key departmental/divisional contacts, supervisors, and municipal contractors	
Suspend or reduce the use of solvents, oil-based paints and stains, solvent-based cleaners and other materials containing volatile organic compounds.	Key departmental/divisional contacts, supervisors, and municipal contractors	
Suspend or reduce the use of pesticides.	Key departmental/divisional contacts, supervisors, and municipal contractors	Some municipalities include a no pesticide use clause in the contract with the maintenance company.
Suspend road resurfacing and paving.	Key departmental/divisional contacts, supervisors, and municipal contractors	Some municipalities include work restrictions in the agreement with their contractor.
Suspend or reduce asphalt roofing.	Key departmental/divisional contacts, supervisors, and municipal contractors	
Suspend or reduce road and path sweeping.	Key departmental/divisional contacts, supervisors, and municipal contractors	
Reduce or suspend strenuous outdoor work.	Municipal/departmental employees, and municipal contractors	To protect employees from adverse health effects.
Enhance infrastructure (bicycle lanes/ paths, sidewalks, bike racks, etc.).	Appropriate municipal employees	To promote alternative transportation – Long Term Initiative.
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	

Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	
Incorporate the use of biodiesel into the equipment and on- and off-road vehicles used for grounds maintenance.	Appropriate municipal employees	Biodiesel burns cleaner than gas, emitting less harmful compounds into the air.
Replace traffic lights with LED lights.	Appropriate municipal employees	LED lights use not only use less energy than older traffic lights, they are also brighter and therefore promote better visibility.

Transportation/All Departments/Divisions with Municipal Fleets

Response	Lead	Comments
Monitor refueling of municipal fleet; suspend gasoline refueling, if possible, otherwise delay essential refueling until the evening or early morning hours.	Key departmental/divisional contacts, supervisors, and municipal contractors	
Implement an anti-idling policy for municipal fleet.	Senior management/council	
Encourage the voluntary reduction in idling.	Municipal employees, municipal fleet, municipal contractors	
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	
Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	
Incorporate the use of biodiesel or ethanols into the municipal fleet.	Appropriate municipal employees	Biodiesel burns cleaner than gas, emitting less harmful compounds into the air.

Public Transit

Response	Lead	Comments
Implement an anti-idling policy for public transit vehicles.	Senior management/council	
Encourage the voluntary reduction in idling.	Municipal employees, municipal fleet, municipal contractors	
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	
Discourage refueling between 9 a.m. and 3 p.m.	Senior management	
Incorporate the use of biodiesel in the public transit vehicles.		Biodiesel burns cleaner than gas, emitting less harmful compounds into the air.

Public Health

Response	Lead/Affected Parties	Comments
Notify sensitive populations (children, the elderly, and those suffering from cardiac and respiratory problems) of smog advisory and actions they can take to protect themselves.	Medical Officer of Health	This could be done through press releases or by setting up an external notification process. See Section 2 for more information.
Encourage the reduction or suspension of strenuous outdoor work or exercise especially for sensitive populations.	All municipal employees, contractors, and the public and private sectors.	To reduce adverse health effects.
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	Including areas where employees who work outdoors gather (e.g., lunch/staff room).
Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	
Provide health protection/promotion information to clients who may not receive educational materials directly.	Collaborate with Social Services	To increase accessibility of information and services.

Social Services/Child Care Services/Community Services

Response	Lead	Comments
Notify municipal daycares, day camps, senior centres and school boards and encourage them to suspend or reduce outdoor activities.	Air Quality Coordinator	Could use an external notification process to accomplish this.
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	
Encourage staff to group their inspections by location and conduct as many of them as possible by foot.	Key departmental/divisional contacts or supervisors	
Encourage staff to do office based work.	Key departmental/divisional contacts or supervisors	
Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	
Make air-conditioned facilities available free of charge.		Would provide a safe play area for children and rest area for sensitive populations.
Provide health protection/promotion information to clients who may not receive educational materials directly.	Collaborate with Public Health	To increase accessibility of information and services.

Finance and Administration/Chief Administrator's Office/City Manager's Office

Response	Lead	Comments
Implement a policy of flexible work schedules.	Senior management	Encourages off-peak vehicle use.
Provide a work-from-home option, where appropriate.	Senior management	Discourages single person vehicle use.
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	Including area where employees who work outdoors gather (e.g., lunch/staff room).
Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	

Heritage/Culture

Response	Lead	Comments
Implement a policy of flexible work schedules.	Senior management	Encourages off-peak vehicle use.
Provide a work-from-home option, where appropriate.	Senior management	Discourages single person vehicle use.
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	
Encourage teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	Discourages single person vehicle use.

Facilities and Real Estate

Response	Lead	Comments
Implement a policy of flexible work schedules.	Senior management	Encourages off-peak vehicle use.
Provide a work-from-home option, where appropriate.	Senior management	Discourages single person vehicle use.
Post Smog Advisory signs and suggested precautions on entrances and exits to all buildings/facilities.	Key departmental/divisional contacts or supervisors	
Encourage the use of teleconferences, e-mail, and phones instead of travelling to meetings.	Senior management	

Special Events

Response	Lead	Comments
Post Smog Advisory signs and suggested precautions throughout the event site(s).	Event coordinator	
Offer water source/supply, and shaded/indoor areas, where possible.	Event coordinator	Indoor relief areas should be cool, non-smoking environments.
Make minor adjustments to schedule, reducing strenuous/heavy physical activity and taking frequent short breaks, during peak smog hours.	Event coordinator	
Encourage staff to wear light clothing or casual dress, where appropriate.	Event coordinator	

Animal Control

Response	Lead	Comments
Suspend use of incinerator or reschedule to night use.	Animal Control Supervisor	

Emergency Response

Response	Lead	Comments
Suspend use of demonstration fires for training.	Chief of Training Officer	

** Ideas for the suggested municipal actions, both general and department specific, were courtesy of a number of municipalities including the City of Toronto, the City of Mississauga, the City of Windsor and Essex County, the City of Markham, Halton Region, and the Region of Waterloo.*

RESOURCE KIT FOR MUNICIPALITIES

This Resource Kit is designed to accompany the Ministry of the Environment's ***Smog Alert Response: A Municipal Guide to Action*** and has been compiled to help municipalities respond effectively to provincial smog advisories by implementing initiatives to combat smog. Municipalities often request samples of by-laws, etc. from other municipalities as a starting point for the implementation of similar initiatives in their community. This Resource Kit provides samples of initiatives currently being implemented in Ontario communities for municipalities to draw from.

TABLE OF CONTENTS

1. CONTRACTS AND POLICIES .64
  - 1.1 Standard Engineering Contract – Smog Day Clause .64
  - 1.2 RFP for Summer Grounds Maintenance Contract .64
  - 1.3 Corporate Vehicle and Equipment Idling Policy .65
  - 1.4 Ground Maintenance Contract .67
  - 1.5 Motion to City Council .69

2. BY-LAWS .70
  - 2.1 Idling Control By-Law .70
  - 2.2 Open Air Burning By-Law .73

3. INTERNAL AND EXTERNAL NOTIFICATION .75
  - 3.1 Newsletter Insert .75
  - 3.2 Air Quality Newsletter .76
  - 3.3 Public Service Announcement .77
  - 3.4 Memorandum from Medical Officer of Health .79
  - 3.5 Post-Smog Advisory Implementation Questionnaire .81
  - 3.6 Smog Alert Response Communications Strategy .82

4. INITIATIVES .85
  - 4.1 Curriculum-Based Air Quality Lesson Plan for Grade 9 Geography Students .85
  - 4.2 Summer Alert Pilot Project Action Plan .86
  - 4.3 Informational Pamphlet Accompanying Parking Ticket for Idling .88

5. PROMOTIONAL MATERIAL .89
  - 5.1 Walking School Bus – School Checklist .89
  - 5.2 Walking School Bus – Sample Promotional Letter .90
  - 5.3 Bulletin – Smog Alert Today .91
  - 5.4 Bulletin – Smog Alert Tomorrow .92
  - 5.5 Web Page Promoting Energy Conservation .93

6. USEFUL LINKS .94

1. CONTRACTS AND POLICIES

1.1 Standard Engineering Contract – Smog Day Clause

Below is a Smog Day Clause from the Standard Engineering Contract from the City of Burlington. It states that in the event of two consecutive days of smog advisories, road work is halted, and may not recommence until the smog advisory has been lifted.

HEALTH AND SAFETY

110.3. Provincial Smog Alert

A provincial smog alert may be issued by the Ministry of the Environment at any time from the end of April through to mid-September when the AQI (Air Quality Index) reaches 50 or greater.

When there is a smog alert, the City of Burlington (Contract Administrator) will notify the General Contractor by 4:00 p.m. On the second day of the smog alert, all hot mix asphalt work is to be stopped unless otherwise directed by the Contract Administrator. This may be in effect until the smog alert has been lifted.

There will be no additional compensation for this down time.

1.2 RFP for Summer Grounds Maintenance Contract

York Region specifies in their 2004 Summer Grounds Maintenance RFP that maintenance that has a negative impact on air quality will not be preformed on Smog Advisory days. This applies to advisories issued by either the Ontario Ministry of the Environment or the York Region Medical Officer of Health. The maintenance tasks are to be recommenced when the Smog Advisory has been lifted. Below is a copy of the clause that details these actions.

Air Quality Advisories: Required at all Locations

Any and all maintenance that would impact on air quality (e.g., grass cutting, pesticide application, use of gas powered equipment) will cease on days when an Air Quality Advisory has been issued by the Ontario Ministry of Environment or the York Region Medical Officer of Health and will cease and recommence on the day the Air Quality Advisory has been cancelled.

1.3 Corporate Vehicle and Equipment Idling Policy

The Region of Peel has a corporate vehicle and equipment idling policy that limits idling time to one minute. It applies to all employees who operate any vehicle owned, rented, or leased by the Region of Peel. The policy also gives facts and statistics about idling and its harmful effects on health and the environment. Below is a copy of the policy.

REGION OF PEEL
CORPORATE VEHICLE AND EQUIPMENT IDLING POLICY

PURPOSE

This document outlines the policy of a one minute idle time to: reduce the air pollution from vehicle and equipment exhausts, create a healthier environment, promote energy (fossil fuel) conservation, reduce noise pollution and reduce wear and service needs on Regional vehicles and equipment.

GENERAL

Vehicles and equipment idling have a significant impact upon the environment. The main areas of environmental impact are air quality and fuel consumption. Air quality is affected by the creation of smog (ozone in the lower levels of the atmosphere and production of carbon monoxide and other air borne pollutants). The affects on humans (and animals) may include respiratory problems ranging from not being able to handle extended outdoor activities to asthma and related disorders.

Idling Facts and Statistics:

1. An idling vehicle emits nearly 20 times more air pollution than when travelling at 50 km/hr.
2. Ontario Ministry of Transportation estimates that an idling gasoline vehicle with an average sized engine uses about 2.2 litres of fuel per hour and that an idling diesel truck engine uses about 3 litres of fuel per hour. Reducing idling time by 10 minutes a day translates into approximately 60.8 hours a year in fuel savings of more than 100 L.
3. Turning off and starting an engine uses LESS fuel than letting the engine run for 30 seconds.
4. Modern vehicles need a maximum of 30 seconds of idle at start up. The best way to warm up a vehicle is by driving it.
5. Engine wear is greater at prolonged idle than during normal operation.
6. Although some fuels pollute less than others, they all contribute to air pollution and are therefore equally affected by this policy.

SCOPE

This policy applies to all employees who are authorized to operate a vehicle/equipment owned, leased or rented by the Region of Peel. Regulatory Affairs, Public Works will ensure that this policy is kept up-to-date.

EXEMPTIONS:

a. For vehicle/equipment maintenance and diagnostic purposes;
b. Under extreme weather conditions or any other time when the health and safety of employees or others may be jeopardized;
c. If the unit is not expected to restart due to mechanical problems (to be repaired ASAP);
d. Assisting on an emergency scene; and
e. When the engine is required to power auxiliary equipment (i.e.: hoist, lift, computers, safety lighting, and internal equipment).

POLICY

1. The driver/operator shall:
    - Not idle the vehicle/equipment while completing a circle check (unless required for air brake pressure or other critical checks necessary).
    - Not leave the vehicle/equipment unattended while idling.
    - Shut down the vehicle/equipment when it is expected to exceed the one minute idle time.
    - Ensure that vehicle/equipment deficiencies are reported immediately to the immediate supervisor or if it is unsafe to turn the unit off.
    - Idle the vehicle/equipment only if the motor is required to power auxiliary equipment.
    - Idle the vehicle/equipment only under extreme weather conditions; and
    - Idle the vehicle/equipment only when the health and safety of employees or others may be jeopardized.

2. The supervisor shall:
    - Make sure that employees are made aware of this policy; and
    - Ensure that all employees adhere to this policy

3. Fleet Services shall:
    - Idle vehicles/equipment only when necessary for maintenance and diagnostic purposes; and
    - Ensure that idling be kept to a minimum.

PROCEDURES

1. The driver/operator will:
    - Check the vehicle/equipment prior to leaving to ensure that safe turn off of the unit can be accomplished.
    - Report the defect in the Vehicle Inspection Log Book and provide to the immediate supervisor to determine if it is safe to be operated or needs to be repaired immediately if the unit can not be turned off.
    - Turn off and remove the keys from the ignition when the vehicle/equipment is left unattended.
    - Turn off the vehicle/equipment, unless the vehicle/equipment motor is to be used for auxiliary power; and
    - Turn off the vehicle/equipment when it is expected to exceed the one minute idle time, and it is safe to do so.

2. The supervisor will:
    - Fill out the Vehicle Repair/Service Request (V-12-041), when the vehicle/equipment is reported to be unsafe to turn off.
    - Determine if vehicle/equipment is to be operated or put in for immediate repair.
    - Put in a request to Fleet Services and with copy of Vehicle Inspection Log sheet.
    - Instruct employees of this policy; and
    - Ensure that all employees adhere to this policy.

POLICY CONSEQUENCES

a. Non-compliance with this policy by the driver/operator may result in disciplinary action; and
b. The supervisor shall ensure that all employees adhere to this policy and deals promptly with all non-compliance issues.

1.4 Ground Maintenance Contract

The following are some clauses from the Regional Municipality of Halton's ground maintenance contract. They include provisions for pesticide free weed control and a clause for smog days. The clause describes actions that must be postponed or cancelled between the hours of 9:00 a.m. and 3:00 p.m. in the event of a smog day.

1.1 In accordance with the recommendations contained in Staff Report MO-24-02, approved by Regional Council on May 8, 2002, the Work performed in accordance with this tender should apply the principles of prudent avoidance of non-essential pesticides and Integrated Pest Management to the full extent possible.

2 DESCRIPTION OF WORK:

2.1 Described generally, the Contractor shall supply and pay for all labour, material, plant, equipment and services necessary to perform weekly maintenance and upkeep of the grounds, including, but not limited to:

- Grass mowing and grounds upkeep
- Non-pesticide weed control and maintenance
- Non-synthetic fertilization of turf, shrubs and trees
- Pruning and Trimming
- Annual flower planting
- Seasonal maintenance

2.2 All work shall be performed according to the specific requirements described in this Tender and with uniformity and consistency in order to ensure a neat and well kept appearance of the grounds.

2.3 The following general principles apply to the Work:

a. Plant Health Care: A healthy plant is less susceptible to stresses such as pests (weeds, insects, disease), environmental pressures (drought) and use. A healthy plant is a product of healthy soil which has proper air and water infiltration, good structure and adequate amounts of nutrients and organic matter.

b. Integrated Pest Management (IPM): IPM is a process that incorporates a combination of management strategies in order to reduce pest populations (weeds, insects, disease) to a sustainable level. IPM involves: planning and managing landscapes to maximize plant health care; identifying potential pests; monitoring pest populations and environmental conditions; using thresholds to determine treatment requirements; using biological, physical, cultural, mechanical and behavioural strategies to reduce and control pests; and evaluating and documenting treatments.

c. The Contractor shall apply the IPM process for all pest and weed control.

2.4 Prior to the Contractor's use of any pesticide, the Contractor shall obtain written authorization from the Regional Representative who shall determine, in accordance with the procedures established by the Region, whether pesticide use is essential in the circumstances. Alternatives to pesticides shall be used to the full extent possible.

3 WEED CONTROL ON HARD SURFACES

3.1 Pesticides, and registered and unregistered pest control products are not to be used at any time to control weeds on hard surfaces.

3.2 The Contractor shall control weeds on all hard surfaces, including but not limited to walkways, steps, rock beds, and river stone areas on the entire site for the duration of the Contract by using any or all of the following methods:

a. Aquaciding by treating with superheated water (Aquacide Unit). Aquaciding service is to be completed by way of hot water application by means of an aquaciding unit specifically designed for this type of service.
b. Mechanical removal.
c. Manual removal by pulling out weeds.

3.3 The Contractor is responsible to ensure that any equipment, methods or products used to control weeds on hard surfaces are used in accordance with the manufacturer's recommendations, and to ensure that the equipment, methods and products used to control weeds on hard surfaces do not damage any features of the site, including, but not limited to the grounds, concrete or interlocking walkways, steps, railings, adjacent structures, finishes, plantings, beds, turf, irrigation systems, etc.

3.4 Aquaciding applications are to take place three (3) times to the entire site as outlined, with three (3) additional follow-up applications throughout the Term of the Agreement, for a total of six visits. Weeds are to be treated on the entire site, at intervals of approximately six weeks, with applications to take place once each in the spring, summer, and late summer. Follow up applications are to take place two weeks after each entire site visit.

3.5 When site conditions do not allow Aquaciding, such as a lack of accessibility, or wet conditions wherein the ground is unable to support heavy equipment, the Contractor is responsible to controi weeds using alternate means as outlined.

Note: Other non-pesticide methods of treating weeds, as recommended by the Contractor, may be approved in writing by the Region.

16 SMOG DAYS

16.1 Halton Region observes Smog Advisories, also referred to as Smog Alerts, as declared by the Ontario Ministry of the Environment, which may affect the performance of certain types of works.

16.2 During Smog Advisories or Smog Alerts, the following types of activities shall not be performed between the hours of 9 a.m. and 3 p.m. on Regional lands:

- The use of Sprayers;
- The use of Internal Combustion Engines for cutting and trimming, etc.;
- Refueling of equipment;
- Sweeping/Blowing or any other activity that may create dust;
- The use of chemicals that emit Volatile Organic Compounds (VOCs);
- Any other activities that contribute to Smog production;

16.3 Automatic notification of Smog Watches, Smog Advisories and/or Smog Alerts is available at http://www.airqualityontario.com

16.4 In the event that the Work cannot be performed because of smog, the Contractor shall reschedule Work for a time when the Smog Alert or Smog Advisory is no longer in effect. The Work shall not be otherwise delayed without the written consent of the Region.

1.5 *Motion to City Council*

Below is the motion that the City of Barrie council considered about the development of a Smog Alert Response Plan. For more information about the importance of high-level municipal support when establishing a Smog Alert Response Plan, refer to page 6.

04-G-350 SMOG ALERT POLICY

That staff work in conjunction with the Eco Health Initiative to develop a smog alert policy for the City of Barrie and report back to General Committee on or before July 5, 2004. (File: E00)

2. BY-LAWS

2.1 *Idling Control By-Law*

The City of London is one of several cities in Ontario that has an idling control by-law. There are several factors that were instrumental in the successful implementation of the anti-idling by-law in London:

- ***Political Climate*** – In London, the political climate was right because air quality was a stated priority of municipal, provincial and federal governments.
- ***Political Support*** – Political support from City Councillors was instrumental in initiating the discussion of the by-law in London, and keeping it alive when there was opposition.
- ***Community-based Support*** – The ACE was instrumental in initiating and developing the by-law. It provided community input, had direct access to City Councillors and took the lead at key points that no doubt kept the process alive.
- ***Active Involvement from the Health Unit*** – Similar to the ACE, the Health Unit showed positive support for the by-law. Because of its well regarded position in the community, its support gave the process credibility and profile.
- ***Working Together*** – The combined and collaborative efforts of the ACE, City Councillors and the Health Unit increased the impact of each stakeholder.
- ***Simple, Tangible, and Controllable*** – In light of the political environment and growing concern related to air quality in London, there was a will to take action. The by-law was a concrete and comparatively simple step that could be taken to improve air quality.
- ***Credibility*** – Having a by-law gives the issue of excessive vehicle idling more credibility. Some argued that an education program was all that was needed, however, supporters argued that this was not enough. They suggested that passing a law legitimizes and raises the profile of the issue and provides a way to deal with the chronically non-compliant.
- ***Taking Responsibility for Enforcement*** – Enforcing a by-law requires resources. When the Health Unit accepted responsibility for enforcement, this removed a possible barrier.
- ***Similar By-Laws in Other Communities*** – The fact that other communities had passed similar by-laws facilitated its acceptance. Precedents had been set.
- ***Air Quality Alert Days*** – One of the strongest facilitators was the occurrence of three air quality alerts in the summer that the law was passed. Growing concerns about air quality and press coverage that London has a higher risk of mortality on these days drew much public attention. These were powerful motivators to take action.

One of the main problems faced by municipalities is how to enforce an anti-idling by-law. London's enforcement of the idling control by-law has three approaches:

1. Citizen's can complain directly to the Health Unit when an infraction occurs, reporting the situation, location, and the offender's vehicle license number; enforcement officers will focus on repeat offenders.
2. Citizen's can report "typical idling behaviour." This includes situations that are not taking place at the time the report is made, but that reportedly "go on all the time." Enforcement officers will contact the parties involved.
3. Encouragement of commercial organizations in the community to initiate idling control policies and practices for those with fleet vehicles or staff who operate their own vehicles in the field on behalf of the organization. Promotion and outreach strategies have been introduced by the Health Unit. Currently, involvement in planning for similar approaches and initiatives is underway with the City of London staff involved in local Air Quality Plan initiatives.

Some of the lessons learned by the City of London during the development of an anti-idling by-law that other municipalities could find useful for the development of any by-law include:

- ***Getting key players onside*** – At the outset of the process, organize support within key stakeholder groups. These include community-based groups, the local health authority, City Council, City staff, and the Ministry of the Environment.

- ***Getting key players working together*** – Develop a mechanism in which stakeholders can work collaboratively.
- ***Gather as much support information as you can early in the process*** – A critical step is to be convincing regarding the value of having the proposed by-law. For example, for an idling-control by-law, collect as much information as possible on the effects of vehicle idling on air quality, climate change, public health and other topics, and be prepared to relate this to the local benefits of having the by-law.
- ***Develop a strategy for measuring the impact of the by-law*** – Even if empirical evidence is not available, develop indicators of success.
- ***Ensure the Councillors who are Championing the Initiative are well Informed*** – Give the Councillors as much information as possible to answer queries and help smooth the process.
- ***Learn from and Refer to the Experiences of Communities*** that have passed similar by-laws.
- ***Determine Responsibility for Key Roles Early in the Process*** – Have clear strategies on communicating and enforcing the by-law in order to minimize and remove barriers.
- ***Emphasize the Indirect Benefits of the Proposed By-Law*** – For example, the direct impact of an idling by-law on overall air quality is not likely to be significant. However, it increases public awareness of this and other environmental issues and contributes to awareness that there are steps that individuals can take. The overall value of an idling by-law should not be determined by examining only direct impacts.

For more information about by-laws and their role in air quality improvement, refer to page 13. Below is a copy of the City of London's anti-idling by-law

PART 1 – DEFINITIONS

1.1 Definitions

In this by-law:

Idle – defined

"Idle" means the operation of the engine of a vehicle while the vehicle is not in motion and not being used to operate auxiliary equipment that is essential to the basic function of the vehicle and "idling" has a corresponding meaning.

Layover – defined

"Layover" means stopping at a point along a transit route for a maximum of fifteen (15) minutes to allow a transit vehicle to adjust to service schedules.

Medical Officer of Health – defined

"Medical Officer of Health" means the Medical Officer of Health for the Middlesex-London Health Unit or a person delegated by him or her for the purposes of this by-law.

Mobile workshop – defined

"Mobile workshop" means

a. A vehicle containing equipment that must be operated inside or in association with the vehicle; or
b. A vehicle serving as a facility for taking measurements or making observations or conducting maintenance or construction operated by or on behalf of a municipality, public utility or police, fire, or ambulance service.

Stopover – defined

"Stopover" means a scheduled delay of a maximum of fifteen (15) minutes at a transit vehicle terminal to allow transit vehicles to adjust service schedules.

Transit vehicle – defined
"Transit vehicle" means London Transit Commission vehicles, paratransit vehicles, tour buses and motor coaches.

Vehicle – defined
"vehicle" means a motor vehicle, trailer, traction engine, farm tractor, or road building machine as defined in the *Highway Traffic Act*, and any vehicle drawn, propelled or driven by any kind of nonmuscular power but does not include cars or electric or diesel electric railways running exclusively upon rails.

PART 2 – PROHIBITED MATTERS

2.1 Idling – more than 5 minutes – prohibited

No person shall cause or permit a vehicle to idle for more than five (5) consecutive minutes.

2.2 Exceptions – 5 minutes does not apply

Section 2.1 does not apply to:

a. Police, fire, or ambulance vehicles while engaged in operational activities, including training activities except where idling is substantially for the convenience of the operator of the vehicle;
b. Vehicles assisting in an emergency activity;
c. Mobile workshops while they are in the course of being used for their basic function;
d. Vehicles where the idling is required as part of a repair process or to prepare a vehicle for servicing;
e. Armoured vehicles where a person remains inside the vehicle while guarding the contents of the vehicle or while the vehicle is being loaded or unloaded;
f. Vehicles that remain motionless because of an emergency, traffic or weather conditions or mechanical difficulties over which the driver has no control;
g. Vehicles engaged in a parade or race or any other such event authorized by Council;
h. Transit and passenger vehicles while passengers are embarking or disembarking en route or at terminals;
i. Transit vehicles while at a layover or stopover location, except where the idling is substantially for the convenience of the operator of the vehicle;
j. Vehicles transporting a person where a medical doctor certifies in writing that for medical reasons, the person requires the temperature or humidity be maintained within a certain range;
k. Vehicles when the ambient outside temperature is more than 27 degrees Celsius (27°C) or less than five degrees Celsius (5°C).

PART 3 – ADMINISTRATION AND ENFORCEMENT

3.1 Administration – enforcement

This by-law shall be administered and enforced by the Medical Officer of Health.

3.2 Fine – for contravention

Any person who contravenes any provision of this by-law is, upon conviction, guilty of an offence and is liable to any penalty as provided in the *Provincial Offences Act*.

3.3 Continuation – repetition – prohibited by order

The court in which a conviction has been entered and any other court of competent jurisdiction thereafter may make an order prohibiting the continuation or repetition of the offence by the person convicted and such order shall be in addition to any other penalty imposed on the person convicted.

2.2 Open Air Burning By-Law

Several municipalities in Ontario have open-air burning by-laws, including the City of St. Thomas. St. Thomas' by-law regulates open-air burning and helps to prevent the spread of fire with in the city. It details when fires are legal and illegal, as well as what types of fires do not require a permit. For more information about how by-laws can be an important part of air quality improvement, refer to page 13. Below is a copy of the City of St. Thomas' open-air burning by-law.

DEFINITIONS

Approved means approved by the Chief Fire Official for the City of St. Thomas

Chief Fire Official means the Fire Chief of the City of St. Thomas, or a member or members of the fire department designed by the Fire Chief

Confined Fire means an open air fire, within a con-combustible perimeter, used for the purpose of cooking food on a grill, supervised at all times and limited in size

Open Air Burning means an approved fire set or caused to be set in a open place, yard, field area, which is not enclosed by a building or structure

Nuisance means excessive smoke, smell, airborne sparks or embers that could cause public nuisances by creating negative health effects on neighbouring residents, increasing fire exposure hazards, infringing on the enjoyment of the use of neighbouring properties and generating false alarms

Permit to Burn means the permit issued by the Chief Fire Official granting permission to set an open air fire, and establishing the conditions under which the permit is granted. This includes special events

Owner/Occupant means the registered owner or any person, firm or corporation having control over, or possession of any portion of the building or property

1. No person shall set fire to, burn or cause or permit to be burned any brush, leaves or other combustibles matter
    a. In or on the streets, parks or public property of the City of St. Thomas
    b. On any private property within thirty metres (100 feet) of any building except as defined in regulation 2.6.3.4. of the Ontario Fire Codes

2. In locations other than the prohibited locations mentioned in paragraph one above, no combustible matter of material shall be set fire to or burned out of doors without permission in writing first being obtained from the Fire Chief or his Designate from the Fire Department of the City of St. Thomas, and then only subject to such terms and condition as are stated in the permission
3. Outdoor fireplaces, boilers, chimneys and other similar solid fuel flame-producing products will contravene the Ontario Fire Code if they are operated within the City of St. Thomas and their use is prohibited. The fire department cannot interfere with the sale and purchase of these devices, but the Ontario Fire Code and the office of the Fire Marshall are clean on prohibiting their use within urban areas

4. Notwithstanding any of the provisions of this by-law, if at any time in the opinion of the Fire Chief or his Designate, it is necessary for the prevention or spread of fire that any fire should be extinguished, the person responsible for, or in charge of, or on whose property the fire is located, shall forthwith extinguish the same on notice of the said Chief, or his Designate, to do so, or the Chief or his Designate may take such steps as he deems necessary forthwith to cause any such fire to be extinguished

5. All open air burning shall comply with the provisions of the *Environmental Protection Act*, R.S.O. 1990, c.E.19, as amended and shall not create nuisance. Any adverse effects that cause an environmental impact could result in an investigation by the Ministry of the Environment

6. The City of St. Thomas Fire Department shall be exempt from the provisions of this by-law with respect to open-air burnings set for the purpose of educating and training

7. Open air burning during a strike shall be subject to a permit and the following additional requirements:
   a. Only one drum shall be used at each location
   b. Fires to be confined to the drums
   c. Only dry wood product may be burned and must be kept a minimum of one metre away from barrel
   d. Drums must be kept three metres (10 feet) from any building, vehicle or any other combustible material
   e. The permit is only valid for the duration of the strike

8. Notwithstanding section 2.6.3.4 of the Ontario Fire Code, no person shall ignite or start a fire in a grill or barbeque for the purpose of cooking food on a balcony of any building containing two (2) or more dwelling units

9. Confined Fire – A person may set or cause to be set a small, confined fire to be used to cook food on a grill or barbecue without a permit, between sunrise and 11 p.m. provided that:
   a. The fire is not more than 61 centimetres (2 feet) by 61 centimetres (2 feet) in size and not more than 61 centimetres (2 feet) in height
   b. No material other than commercial charcoal, briquettes or clean dry seasoned wood may be burned
   c. The fire is located at a distance of no less than five (5) metres from any building, structure, property line, tree, hedge, fence, roadway, or other combustible article
   d. The wind velocity is not greater than twenty-four (24) kilometres per hour
   e. The fire does not create a nuisance
   f. A suitable means of extinguishment is available while the fire is burning
   g. The fire shall be supervised by a competent adult while the fire is burning

10. Any person in contravention of any of the provisions of this by-law shall have a fee imposed as per City of St. Thomas By-Law 183-2002 being a by-law to impose fees or charges with respect to Fire Department matters, or they may be charged under the Ontario Fire Code

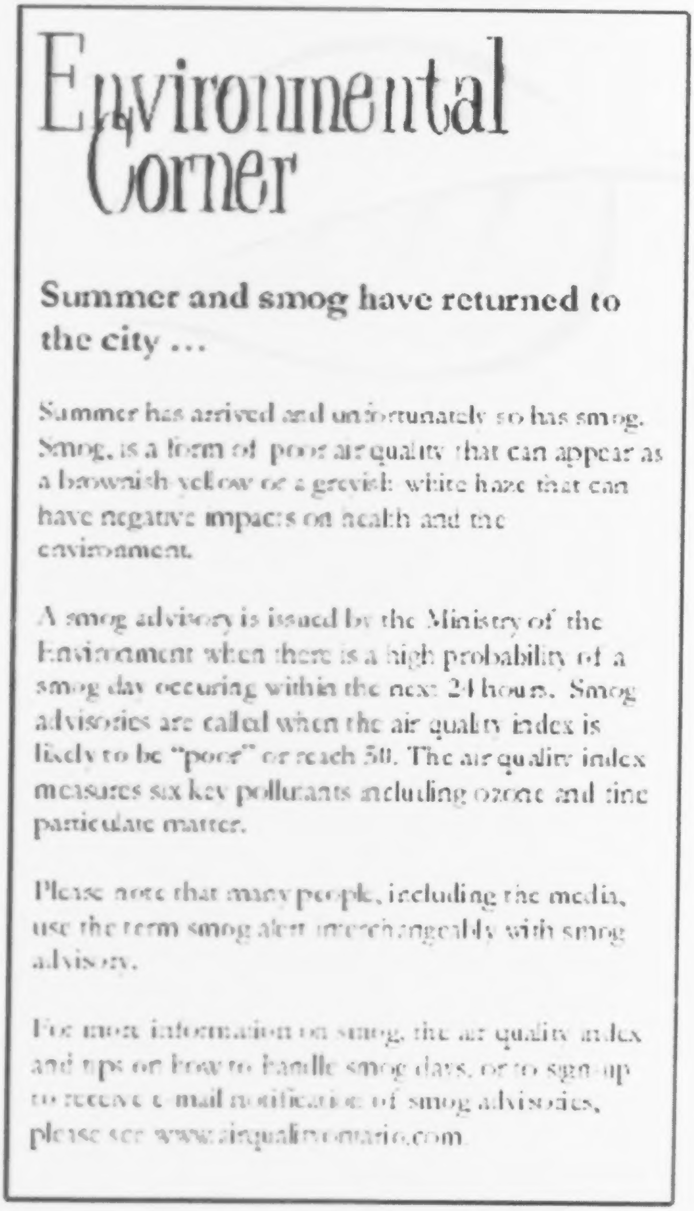
11. If any person fails to pay the fees set out above, within thirty (30) days, the amount of the fee may be recovered by the Corporation in like manner as municipal taxes in accordance with the *Municipal Act.*

12. This by-law shall be referred to as the Open Air Burning By-Law

3. INTERNAL AND EXTERNAL NOTIFICATION

3.1 Newsletter Insert

The City of Burlington has a local newspaper that is published three times a week. An Environmental Corner is posted in the newspaper's City Update section bi-weekly on Fridays, which provides the public with information about smog, tips and actions that can be taken on smog days, pesticides, and other air quality related information. For more information about community outreach and education, refer to page 14. The following example of the Environmental Corner announces the beginning of the smog season, what smog advisories are, and where to get more information.



Environmental Corner

Summer and smog have returned to the city ...

Summer has arrived and unfortunately so has smog. Smog, is a form of poor air quality that can appear as a brownish yellow or a greyish white haze that can have negative impacts on health and the environment.

A smog advisory is issued by the Ministry of the Environment when there is a high probability of a smog day occuring within the next 24 hours. Smog advisories are called when the air quality index is likely to be "poor" or reach 50. The air quality index measures six key pollutants including ozone and fine particulate matter.

Please note that many people, including the media, use the term smog alert interchangeably with smog advisory.

For more information on smog, the air quality index and tips on how to handle smog days, or to sign-up to receive e-mail notification of smog advisories, please see www.airqualityontario.com.

3.2 Air Quality Newsletter

In Windsor-Essex County, a grade school student and her mother prepared an Air Quality Newsletter, which was distributed to Windsor-Essex County Region Elementary School students.

Included in the first section entitled "What exactly is SMOG?" was information about the components of smog, how and when it is created, and smog's negative impact on the environment and public health. Also included in the newsletter were health precautions recommended by the Lung Association, and suggested actions that families can do at home and on the road.

The newsletter lists phone numbers, e-mail addresses, and Web sites for those who want to get more information about air quality, including the Ontario Ministry of the Environment local office number and Air Quality Web site, the Lung Association Web site, and Environment Canada's Web site.

The newsletter concludes with information about what the municipal, provincial, and federal governments are doing to improve air quality.

For more information about community outreach and education, refer to, page 14.

3.3 Public Service Announcement

When the first smog advisory is called in York Region, a public service announcement, like the one below, is released. It begins by discussing what a smog advisory is. The announcement then gives information about the causes of smog, and its adverse health effects. It then goes on to discuss what the Air Quality Index is, and how the Ontario Ministry of the Environment uses it to declare smog advisories. The announcement suggests precautionary steps that the public can take to protect their health, as well as tips for helping to reduce local smog levels. It concludes by providing phone numbers and Web sites for those that would like more information.

York Region

Public Service Announcement

DATE

For Immediate Release

SMOG ADVISORY INFORMATION

NEWMARKET – The first smog advisory of the season has been issued by the Ontario Ministry of the Environment for various areas, including York Region. The advisory will remain in effect until further notice.

A Smog Advisory means that there is a strong likelihood that there may be poor air quality within the next 24 hours due to ground-level ozone and/or fine particulate matter. The Air Quality Index program is managed by the Ministry of the Environment, who issues the information to the public.

As an education measure, York Region Health Services offers residents the following information to become better informed and protected from the harmful effects of exposure to smog.

During the warm weather months, York Region may experience periods of smog that can cause air quality to fall well below acceptable standards. Smog is a combination of airborne pollutants that affect our health and our natural environment. Most harmful are ground-level ozone and fine airborne particles that, once inhaled, can introduce harmful mixtures of chemical compounds into our lungs.

Smog most often occurs on hot, humid summer days. Ground-level ozone forms when nitrogen oxides and volatile organic compounds react together in the presence of intense sunlight. Smog levels are influenced by factors such as weather systems and airflow patterns. High levels of smog are often removed after a heavy rainfall.

In some people, even mild exposure to ground-level ozone can cause eye, nose and throat irritations, coughing, wheezing and shortness of breath. Smog can lower resistance to infection and can cause illness in people with heart and lung conditions. Those at particular risk include young children, the elderly, asthmatics and anyone with existing respiratory or coronary conditions.

Smog levels are monitored. The Air Quality Index (AQI) is a rating scale that measures outdoor air quality in Ontario. The AQI translates pollutant levels into numbers to determine whether the air quality is considered to be "good," "moderate" or "poor." Generally, the lower the AQI, the better the air quality.

The AQI program is managed by the Ministry of the Environment (MOE). The MOE conducts hourly readings of the most common air pollutants year-round at 36 sites province-wide and provides as many as six public reports per day during May to September. A Smog Alert is declared if forecasts indicate the AQI may exceed a reading of 50 in a given geographic area.

The MOE issues two kinds of Smog Alerts. A "smog watch" indicates a 50% chance that poor air quality will occur within the next three days. A "smog advisory" is issued when there is a high probability that there may be poor air quality within the next 24 hours due to ground-level ozone and particulate matter.

During a Smog Alert, the public is advised to take precautions to minimize exposure to air pollutants and to refrain from activities that could worsen air quality. The following is suggested to protect those most affected by smog:

- Avoid strenuous exercise and limit outdoor activities
- Reschedule or plan outdoor activities for early in the morning or late in the day when pollutant levels are considerably lower
- Keep away from high traffic areas to reduce exposure to vehicle exhaust
- Stay inside in a cool air-conditioned or well-ventilated environment
- Drink plenty of fluids to prevent dehydration
- Seek medical attention for those complaining of symptoms such as tightness in their chests, coughing, wheezing or shortness of breath, excessive weakness or fatigue

Individuals and businesses can make a big difference in helping to reduce smog levels, including:

- Limit the use of cars: Walk, cycle, carpool or take public transit
- Telecommute (work from home) and teleconference whenever possible
- Reduce unnecessary engine idling of your vehicle at all times
- Restrict the use of oil-based paints, solvents, pesticides, glues, gas-powered engines (such as lawnmowers and leaf blowers) and barbecues
- Conserve energy: Turn down the air conditioner and turn off lights you are not using. Use energy efficient light bulbs. Install low-flow showerheads and aerators in faucets to conserve water

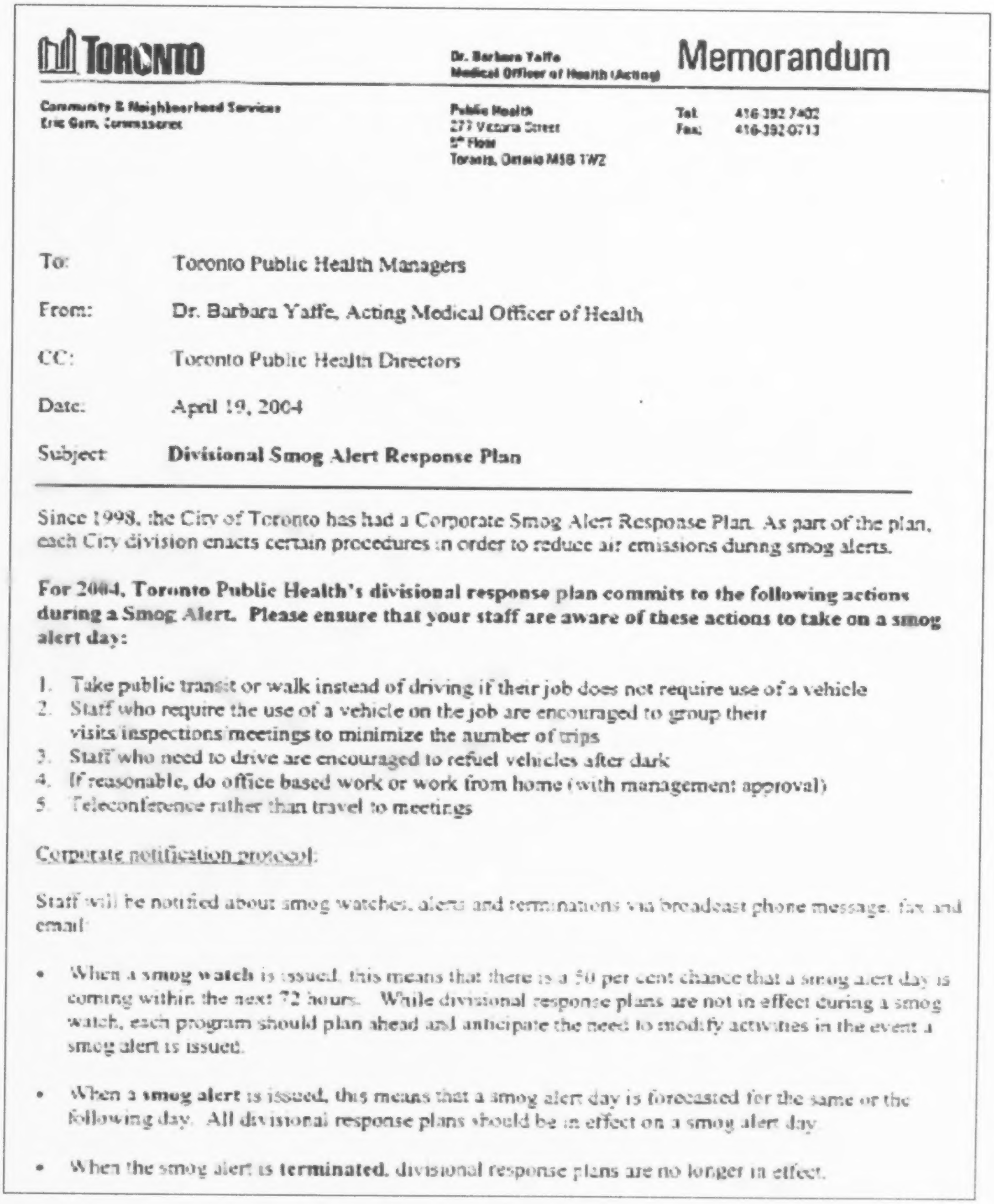
For further information on air quality issues or a copy of the *Smog Alerts* booklet, contact York Region Health Services *Health Connection* at 1-800-361-5653 (toll-free).

To find out what the current Air Quality Index (AQI) readings are for York Region, contact the Ministry of the Environment. The MOE posts air quality reports and 3-day forecasts at www.airqualityontario.com. Residents can be directly notified of Smog Alerts by registering for the *Smog Alert by E-mail* service on the provincial Web site.

For more information on the Regional Municipality of York, the services we offer and links to our nine area municipalities, please visit our Web site at www.region.york.on.ca

3.4 Memorandum from Medical Officer of Health

Toronto's Medical Officer of Health sends out a memo, like the one below, to all Toronto Public Health managers and directors. It asks the managers to remind their staff of actions that they can take during smog advisories, and discusses year-round actions that can be taken to reduce smog. It also discusses the corporate notification protocol, and educational resources that are available. It closes by giving contact information for the divisional representative of the City's Corporate Smog Alert Response Plan. For more information about the internal notification process, refer to page 6.



TORONTO

Dr. Barbara Yaffe
Medical Officer of Health (Acting)

Memorandum

Community & Neighbourhood Services
Eric Gam, Commissioner

Public Health
277 Victoria Street
5th Floor
Toronto, Ontario M5B 1W2

Tel: 416-392-7402
Fax: 416-392-0713

To: Toronto Public Health Managers

From: Dr. Barbara Yaffe, Acting Medical Officer of Health

CC: Toronto Public Health Directors

Date: April 19, 2004

Subject: **Divisional Smog Alert Response Plan**

Since 1998, the City of Toronto has had a Corporate Smog Alert Response Plan. As part of the plan, each City division enacts certain procedures in order to reduce air emissions during smog alerts.

For 2004, Toronto Public Health's divisional response plan commits to the following actions during a Smog Alert. Please ensure that your staff are aware of these actions to take on a smog alert day:

1. Take public transit or walk instead of driving if their job does not require use of a vehicle
2. Staff who require the use of a vehicle on the job are encouraged to group their visits/inspections/meetings to minimize the number of trips
3. Staff who need to drive are encouraged to refuel vehicles after dark
4. If reasonable, do office based work or work from home (with management approval)
5. Teleconference rather than travel to meetings

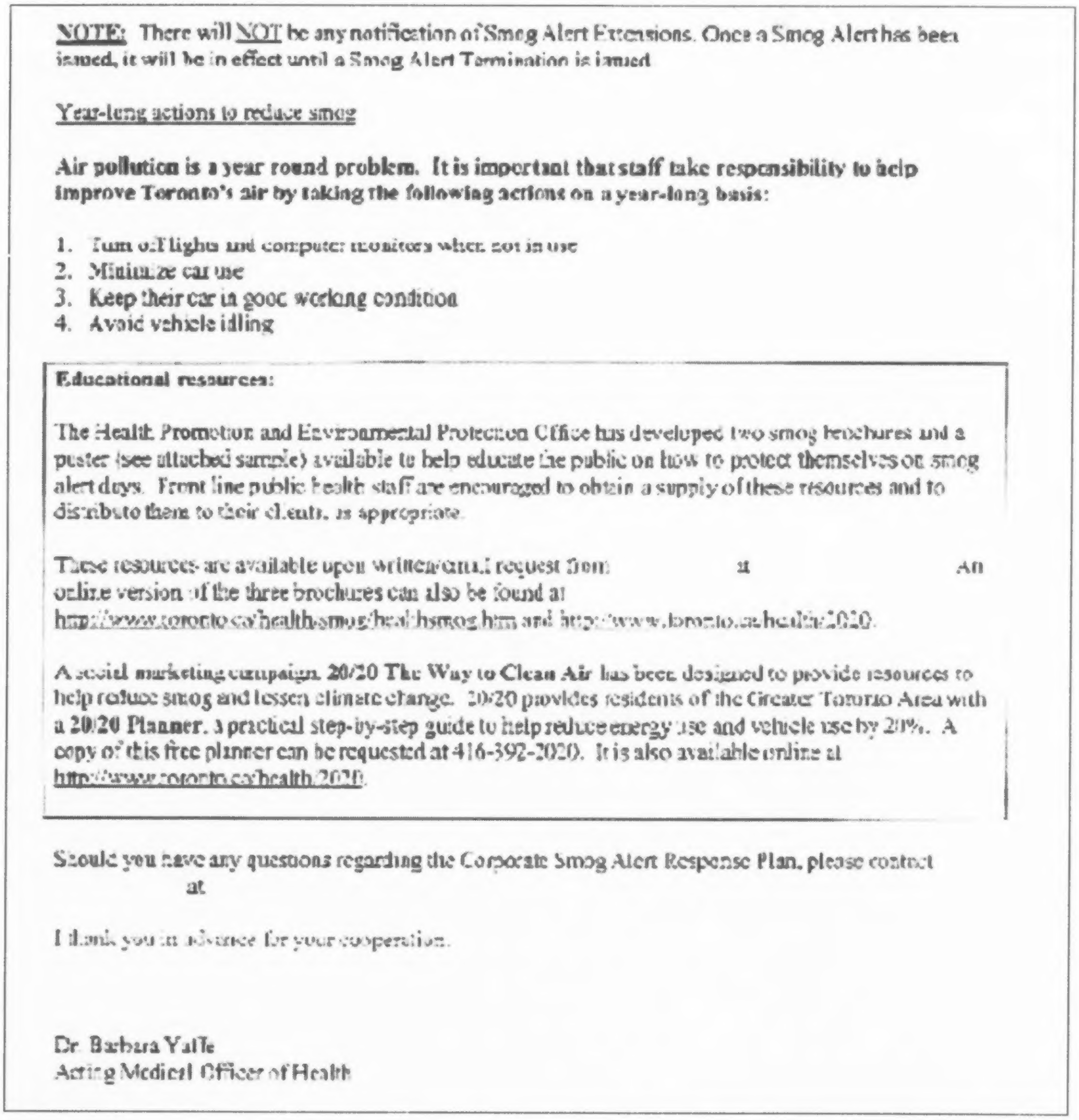
Corporate notification protocol:

Staff will be notified about smog watches, alerts and terminations via broadcast phone message, fax and email:

- When a **smog watch** is issued, this means that there is a 50 per cent chance that a smog alert day is coming within the next 72 hours. While divisional response plans are not in effect during a smog watch, each program should plan ahead and anticipate the need to modify activities in the event a smog alert is issued.

- When a **smog alert** is issued, this means that a smog alert day is forecasted for the same or the following day. All divisional response plans should be in effect on a smog alert day.

- When the smog alert is **terminated**, divisional response plans are no longer in effect.



NOTE: There will NOT be any notification of Smog Alert Extensions. Once a Smog Alert has been issued, it will be in effect until a Smog Alert Termination is issued.

Year-long actions to reduce smog

Air pollution is a year round problem. It is important that staff take responsibility to help improve Toronto's air by taking the following actions on a year-long basis:

1. Turn off lights and computer monitors when not in use
2. Minimize car use
3. Keep their car in good working condition
4. Avoid vehicle idling

Educational resources:

The Health Promotion and Environmental Protection Office has developed two smog brochures and a poster (see attached sample) available to help educate the public on how to protect themselves on smog alert days. Front line public health staff are encouraged to obtain a supply of these resources and to distribute them to their clients, as appropriate.

These resources are available upon written/email request from at An online version of the three brochures can also be found at http://www.toronto.ca/health/smog/healthsmog.htm and http://www.toronto.ca/health/2020.

A social marketing campaign **20/20 The Way to Clean Air** has been designed to provide resources to help reduce smog and lessen climate change. 20/20 provides residents of the Greater Toronto Area with a **20/20 Planner**, a practical step-by-step guide to help reduce energy use and vehicle use by 20%. A copy of this free planner can be requested at 416-392-2020. It is also available online at http://www.toronto.ca/health/2020.

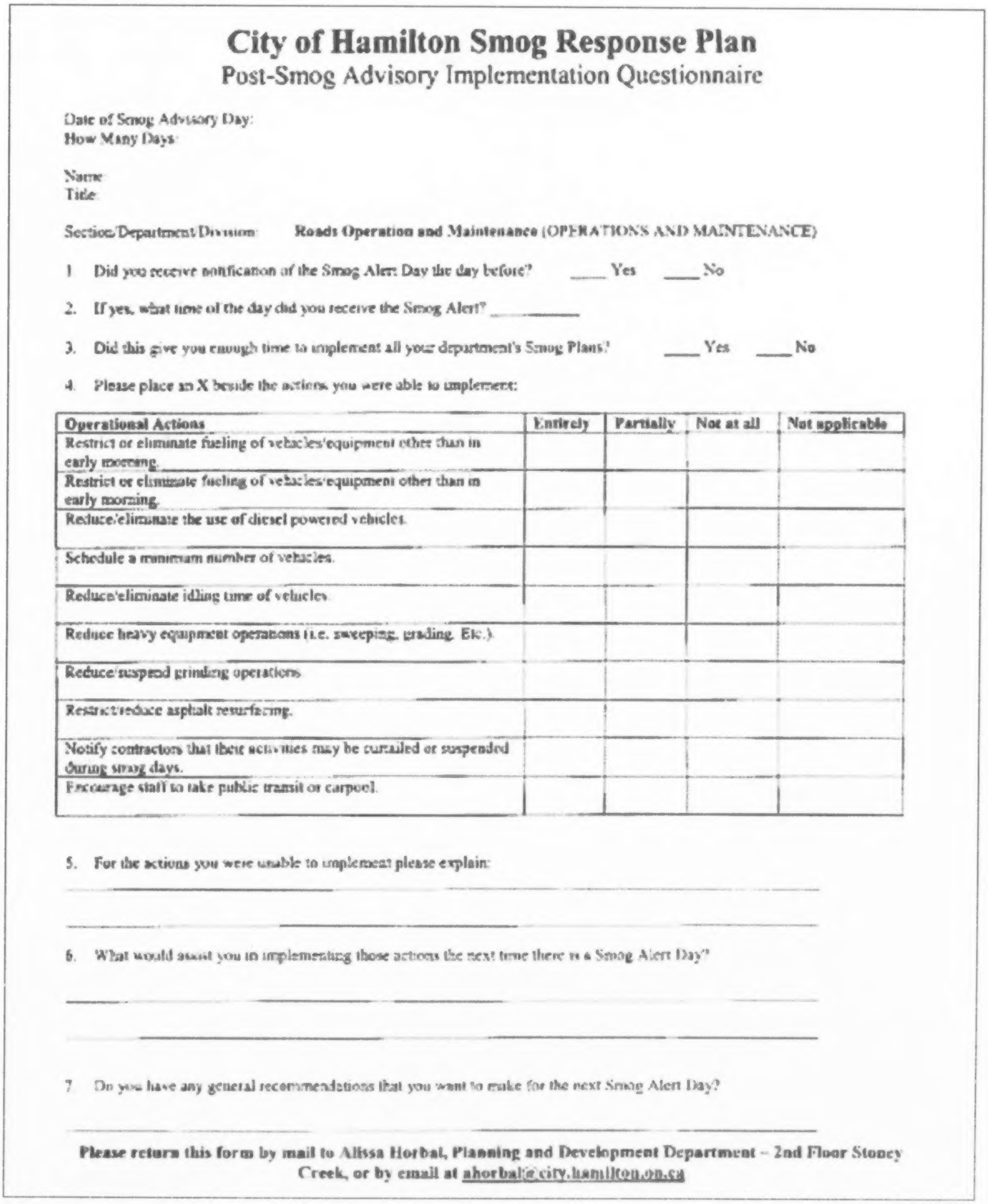
Should you have any questions regarding the Corporate Smog Alert Response Plan, please contact at

Thank you in advance for your cooperation.

Dr. Barbara Yaffe
Acting Medical Officer of Health

3.5 Post-Smog Advisory Implementation Questionnaire

Following a smog advisory, the City of Hamilton distributes a short survey to their staff to assess the effectiveness of their smog response plan. The information collected enables the City to review the implementation aspect of the response plan and revise it accordingly. Below is a copy of the Post-Smog Advisory Implementation Questionnaire.



City of Hamilton Smog Response Plan

Post-Smog Advisory Implementation Questionnaire

Date of Smog Advisory Day:
How Many Days:

Name:
Title:

Section/Department/Division: **Roads Operation and Maintenance (OPERATIONS AND MAINTENANCE)**

1. Did you receive notification of the Smog Alert Day the day before? ____ Yes ____ No
2. If yes, what time of the day did you receive the Smog Alert? __________
3. Did this give you enough time to implement all your department's Smog Plans? ____ Yes ____ No
4. Please place an X beside the actions you were able to implement:

Operational Actions	**Entirely**	**Partially**	**Not at all**	**Not applicable**
Restrict or eliminate fueling of vehicles/equipment other than in early morning.				
Restrict or eliminate fueling of vehicles/equipment other than in early morning.				
Reduce/eliminate the use of diesel powered vehicles.				
Schedule a minimum number of vehicles.				
Reduce/eliminate idling time of vehicles.				
Reduce heavy equipment operations (i.e. sweeping, grading, Etc.)				
Reduce/suspend grinding operations.				
Restrict/reduce asphalt resurfacing.				
Notify contractors that their activities may be curtailed or suspended during smog days.				
Encourage staff to take public transit or carpool.				

5. For the actions you were unable to implement please explain:

6. What would assist you in implementing those actions the next time there is a Smog Alert Day?

7. Do you have any general recommendations that you want to make for the next Smog Alert Day?

Please return this form by mail to Alissa Horbal, Planning and Development Department – 2nd Floor Stoney Creek, or by email at ahorbal@city.hamilton.on.ca

3.6 Smog Alert Response Communications Strategy

The City of Mississauga Smog Alert Response Plan includes a communication strategy to raise the awareness of the city staff and the public with regards to smog. The following is an excerpt from their Smog Alert Response Plan.

CITY OF MISSISSAUGA
SMOG ALERT RESPONSE
COMMUNICATIONS STRATEGY

GOAL: To increase awareness and understanding of smog and to advise stakeholders about the City of Mississauga's activities during a smog alert.

THE STAKEHOLDERS: KEY PARTNERS

City of Mississauga

Mayor & Council/Senior Management Team

Transportation & Works	– Infrastructure & Environmental Planning – Maintenance & Operations – Service Centres – Engineering Technical Services – Mississauga Transit
Planning & Building	– Building Division
Community Services	– Facilities & Property Management – Recreation & Parks – Fire & Emergency Services
Corporate Services	– Communications – Information Technology – Enforcement – Material Management

Region of Peel Environmental Health

GTA Clean Air Council

Ministry of the Environment (MOE)

Air Quality Office, Environmental Monitoring & Reporting Branch

MEDIA CONTACT

A Public Affairs representative may speak with the media (in general terms) about the Mississauga Air Quality Technical Advisory Committee and air quality issues. Key spokespersons (as listed below) will be contacted in most cases. Call: Mark Guinto, Public Affairs Consultant 905-896-5933.

SPOKESPERSONS

Those who can speak to the media in more detail about the air quality committee's initiatives and air quality issues are listed below:

City Staff

1. Brenda Sakauye, Environmental Coordinator and Chair, Mississauga Air Quality Technical Advisory Committee, Transportation & Works
2. Tom Mulligan, Director, Engineering & Transportation Planning, Transportation & Works
3. Tony Fleischmann, Manager, Urban Forestry, Recreation & Parks, Community Services

City Council
1. Councillor Pat Mullin, Ward 2

Region of Peel Health
1. Paul Callanan, Director, Environmental Health, Region of Peel

Ministry of the Environment, Air Quality Office
1. David Yap, Chief Meteorologist and Manager, Air Quality Office, Specialized Monitoring and Air Quality, MOE

KEY MESSAGES ON SMOG

1. What is Smog?

Smog refers to hazy air that causes difficult breathing conditions. Smog most often occurs on hot summer days. Heat and sunlight react with gases and fine particles in the air to form smog. The most harmful components of smog are:

- *Ground-level ozone* – produced by chemical reactions of nitrogen oxides (NO_X), emitted mainly by the transportation sector, and
- *Volatile organic compounds* (VOCs) from human and natural activities, in the presence of sunlight

Definitions

Nitrogen oxides (NO_X) – come from the combustion of coal, gas, and oil in motor vehicles, homes, industries and power plants.

Volatile organic compounds (VOCs) – derive from burning gasoline and the evaporation of liquid fuels, solvents and organic chemicals (e.g., oil-based paints, cleaners).

Airborne inhalable particles – suspended in the atmosphere are derived from dust, smoke, pollen, and vehicle emissions.

2. Health Effects of Smog

Smog can:

- cause eye, nose and throat irritation;
- cause coughing, wheezing and shortness of breath;
- lower resistance to infections;
- make heart and lung conditions worse and lead to hospitalization and premature death

Smog is especially harmful to: children, seniors, pregnant women, people with heart and lung conditions, and smokers.

3. City Smog Alert Response Actions

The following summarizes the operational responses by City staff on smog advisory days:

- *Parks* will curtail gas and diesel powered tools and equipment after 10:00 a.m. and will be replaced with hand labour jobs. This applies to City staff only; contractors may continue to cut grass along boulevards.
- *Parks, Transit* and *Traffic Maintenance* will curtail the use of oil-based paints and solvents; road paint will be restricted to night operations.
- *Works* will reschedule street sweeping to night operations.
- *Fire & Emergency Services* will discontinue training with live fires.
- *Animal Control* will suspend or curtail to evenings incinerations operations.
- *Inspectors* in all departments will reduce engine idling & refuel the night before a smog day.
- *Communications* will implement various internal & external communications strategies.

4. Resident Activities during a Smog Alert (Tips)

Everyone can help reduce smog formation by:

- Reducing the use of your car by walking, car pooling or taking public transit;
- Ensuring your car is in good repair (tires inflated/engine tuned) if you must drive; do not leave cars idling; and
- Reducing energy consumption by setting air conditioners a few degrees warmer and postponing laundry activities until evening hours.

On smog days:

- Avoid strenuous exercise/outdoor activities;
- Do not use oil-based paints, glues and pesticides;
- Do not use gas-powered garden equipment; and
- Refuel your car in the evening after the sun has set/air is cooler (vapours escape when gas is pumped).

STRATEGIC STEPS

PRIOR to Smog Alert

(Internal)

1. Meet with stakeholders (managers/supervisors) to brief them on the Smog Alert Response Plan and review departmental responsibilities and course of action.
2. Write *Network* (staff newsletter) article on smog in summer issue.
3. Introduce Intranet Reminders – brief messages from Mississauga Air Quality Committee which includes a smog warning, smog tips for staff and links to the Environment Web page.
4. Ensure Smog articles on the Environment Web page are up-to-date.

(External)

1. News releases on an as-needed basis.
2. Update recorded message for Inquiries (896-5000) so it is ready for use during a smog alert.
3. Redistribute Smog brochure on City's Smog Alert Response Plan to all city facilities i.e., arenas, community centres, libraries.
4. Include smog information in City's Air Quality display
5. *Your Guide* (guide to all city homeowners) – include an article on the myths of engine idling and smog information in this annual publication.
6. Provide the Weather Network with City Smog Alert Response Plan to use during their local AM news show on smog advisory days.

DURING a Smog Alert

(Internal)

1. Ensure news release/message is posted on Intranet
2. Record smog message on City Voice Messaging

(External)

1. Issues news release(s) – to be determined
2. Ensure the news release(s) is posted on the City's Intranet and Internet sites.
3. Record smog message on City Voice Messaging
4. Liaise with media requesting live interviews with spokespersons on this issue.
5. Provide Mayor information to use on the Mayor's Hour – a weekly cable show (if timely)

TARGET AUDIENCES: Council Members, Municipal Staff, Residents, Media

MEDIA TARGETS: Southern Ontario, GTA, local-community, business and health (print & broadcast)

4. INITIATIVES

4.1 Curriculum-Based Air Quality Lesson Plan for Grade 9 Geography Students

The Citizens' Advisory Committee on Air Quality (Waterloo Region) worked with the local school board and the Region of Waterloo Public Health to develop an Air Quality lesson plan for grade 9 geography classes. One section of the lesson plan discusses smog. Specifically, the lessons examine the causes of smog, and its impact on human health and the health care system. Though the main focus of the lessons is smog in Ontario, they also touch upon smog in other parts of the world. The lessons attempt to teach students how they can reduce their contributions to smog, as well as give them an understanding of how the Air Quality Index works. For more information and a complete version of the lesson plan, refer to: http://www.airqualitywaterlooregion.org and select the "Educators" link.

Components – The smog lessons are broken down into the following components:

- What is Smog?
- The Key Components of Smog
- Sources of Smog
- The Effects of Smog on Certain Segments of the Population
- Smog Alerts
- The Air Quality Index
- What You Can Do to Help Reduce the Overall Levels of Smog in the Air
- Smog in Ontario
- The Worst Case of Smog Ever Recorded (The London Smog of 1952)
- Smog in Other Parts of the World (The "Brown Haze" over Asia)
- Study of the Atlantic Olympics
- Fast facts

Estimated time Required: 4 to 5 periods

Materials Required: A computer lab with access to the internet (optional).

Meeting Grade 9 Curriculum:

In the "Learning through Application" section of the Geographic Foundations: Space and Systems strand students will:

- Identify how they can contribute to the quality of life in their home, local bioregion, province, nation, and the world;

In the "Understanding Concepts" section of the Human Environment Interactions strand students will:

- Demonstrate an understanding of how human activities (e.g., agricultural and urban development, waste management, parks development, forest harvesting, land reclamation) affect the environment; lands and wilderness;

In the "Understanding Concepts" section of the Understanding and Managing Change strand students will:

- Demonstrate an understanding of selected factors that cause change in human and natural systems (e.g., technological change, corporate and government policies, zoning bylaw changes, natural hazards)
- Predict the consequences of human activities (e.g., agriculture, recreation) on natural systems (e.g., soil depletion, climate change);

- Identify and analyze the positive and negative impacts on people and the environment of the manufacture, transportation to market, and consumption of selected products (e.g., cars, clothing, tropical food products)

Exercises – The teacher should determine how these exercises will be marked and how long students will spend on them.

1. Have the students check the air quality index for a city in Ontario using the www.airqualityontario.com Web site. Have them record "Today's Readings" as well as the "Two Day History." Then have the students chart the readings for that city for the three days making sure to also record the Date, Time, AQI, Category and Cause.

2. Before students are shown the "What You Can Do to Help Reduce the Overall Levels of Smog in the Air" section, have them come up with their own ideas (in groups or by themselves) on how they can reduce smog. After comparing their ideas to the ones in the section, have the students create a poster for the general public on smog and the ways people can reduce it. They can use the information provided to them in the "Fast Facts" section or any other section in the Smog component. The poster should include the following:
   - At least four suggestions for ways the community can reduce smog as chosen by the student
   - An illustration (e.g., sketch, photocopied photograph, diagram, or graph) for each of the four suggestions displayed on the poster
   - At least four text boxes or captions of approximately 50 words each, explaining how the suggestions displayed on the poster would benefit the community
   - One prediction for what might happen if we achieve or fail to achieve sustainable management, including an explanation of why this may happen

4.2 Summer Alert Pilot Project Action Plan

York Region sent out summer alert packages in the summer of 2002 to day cares, early years centres, media, and health services centres within the region, with a goal of raising public awareness about summer health problems, including smog. These packages contained information about summer health issues, including sun safety, heat related illness, smog, West Nile virus, and water conservation. For more information about community outreach and education, refer to page 14. Below is an action plan for York Region's Summer Alert Pilot Project.

BACKGROUND:
The Summer Alert Team, consisting of Public Health Nurses and Public Health Inspectors, was originally formed as a proactive response to impending heat alerts for the 2002 summer season. Initially, the group focused on developing heat alert information, but soon expanded to include a broader range of summer health issues.

GOAL: To raise awareness of issues that affect our health in summer.

OBJECTIVES:
1. To develop a comprehensive package of information and resources on issues that affect our health in summer
2. To distribute the information packages to the employees and parents of children who attend day care in selected York Region day care centres
3. To evaluate the effectiveness of the information packages and the summer alert messages

ACTIVITIES:

1. Research issues that affect our health in summer
2. Identify topics to be included in the summer alert package
3. Develop a package of summer alert information
4. Randomly select day care centres to receive the package
5. Distribute the packages to selected day care centres and identified York Region Health Services Department staff
6. Evaluate the effectiveness of the packages with follow-up phone calls to recipients of the packages

SUMMER ALERT PACKAGE CONTENTS:

The Summer Alert Packages contained a cover letter and information on summer health issues as follows:

• Sun safety	4 fact sheets, 1 pamphlet, 1 bookmark
• Heat Related Illness	1 fact sheet
• Smog Alert	8 page booklet
• Idling	poster and decal
• Pesticide Use	1 pamphlet
• West Nile Virus	1 poster, 1 fact sheet, 1 pamphlet
• Water Conservation	1 pamphlet

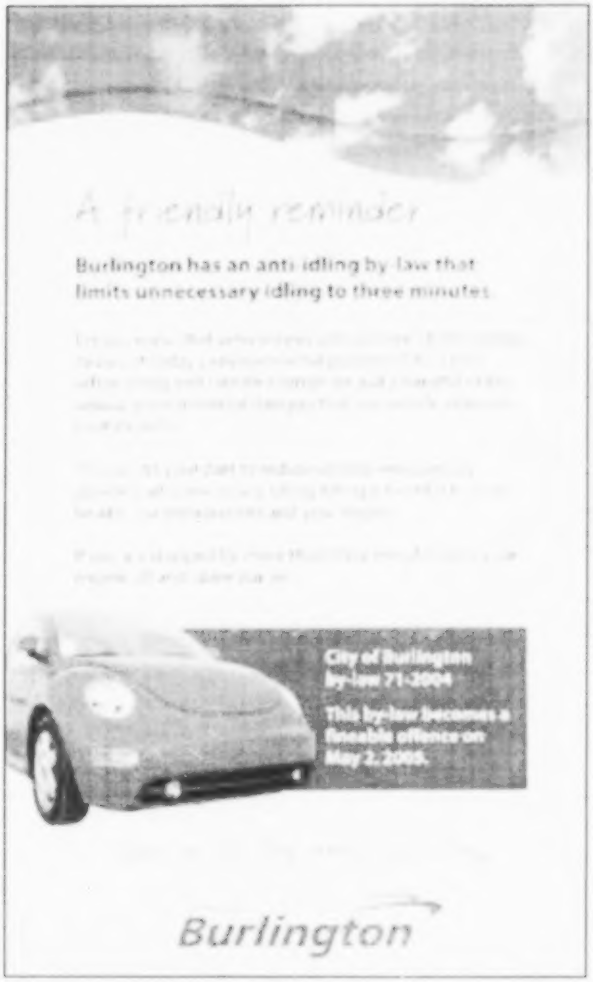
SUMMER ALERT PACKAGE DISTRIBUTION:

The Summer Alert Packages were distributed in June 2002 as follows:

• York Region Day Care Centres	86 packages
• Early Years Centres in York Region	6 packages
• York Region Media	1 package
• York Region Health Services:	
• Health Connection	1 package
• Healthy Babies, Healthy Children Team	3 packages
• School Team	1 package

4.3 *Informational Pamphlet Accompanying Parking Ticket for Idling*

The City of Burlington council passed an idling control by-law that limits unnecessary idling to three minutes. The by-law's intent is to educate the public about the issue and act as a deterrent. Fines will be issued when drivers refuse to turn off their engines or when they are observed to be repeat offenders. The City of Burlington produces information cards, as seen below, which are to be used by parking enforcement officers when they approach community members idling their vehicle. The city also distributes posters and bookmarks communicating idling messages to all Burlington public and separate schools as well as participating bookstores and municipal facilities, including libraries.



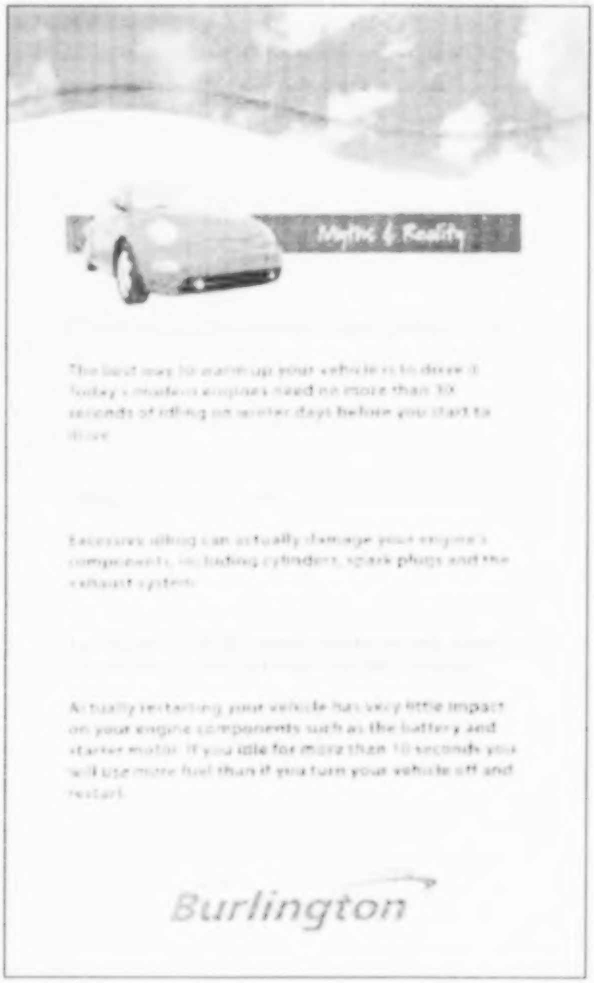
A friendly reminder

Burlington has an anti idling by-law that limits unnecessary idling to three minutes.

City of Burlington by-law 71-2004

This by-law becomes a fineable offence on May 2, 2005.

Burlington



Myths & Reality

The best way to warm up your vehicle is to drive it. Today's modern engines need no more than 30 seconds of idling on winter days before you start to drive.

Excessive idling can actually damage your engine's components, including cylinders, spark plugs and the exhaust system.

Actually restarting your vehicle has very little impact on your engine components such as the battery and starter motor. If you idle for more than 10 seconds you will use more fuel than if you turn your vehicle off and restart.

Burlington

5. PROMOTIONAL MATERIAL

5.1 Walking School Bus – School Checklist

Several schools across Ontario have one or more Walking School Buses organized. Walking School Buses promote cleaner air, as well as a safe way to school for children and increased physical activity. Many schools who do not have Walking School Buses participate in designated walk to school days, such as "Walking Wednesdays," weekly or monthly. There is also an International Walk to School Day every fall, and in 2003, over 850 schools in Ontario took part. Below is a summary of the school checklist that can be found on the Active and Safe Routes to School Web site. For more information on the Walking School Bus and other Active and Safe Routes to School initiatives, refer to: www.saferoutestoschool.ca

HOW TO ORGANIZE A
WALKING SCHOOL BUS
PROGRAM

What do you have when you combine healthy exercise with hands-on street proofing lessons and reduced air pollution emissions? A Walking School Bus! Don't believe us? Why not try organizing and participating in a Walking School Bus for one week and then decide. Here's how to get Walking School Buses going in your community.

Nearly 9 out of 10 parents who walk their children to school see it as an ideal way to meet new people, socialize at the school gate and get some daily exercise, concludes a study by the Department of Transport, Local Government and the Regions (DTLR) in the UK (www.dtlr.gov.uk)

A Walking (or Cycling) School Bus is two or more families, travelling together for safety.

16.4.1.1 What to Do	Y
1. Map the routes to school to create the **School Map**. You will need a clear map of your school catchment area. **www.mapquest.com** might be useful for you to get a map of your school area.	
2. Determine interest in participating in Walking School Bus Week. Modify the **Sample Parent Letter** (follows) and send home with the **WSB flyer** (follows) to your families. Include a copy of the school area map so parents can indicate the approximate location of their homes.	
3. Mark the locations on the school area map to identify which routes have enough families to participate in a WSB, using the completed WSB flyers returned from the families.	
4. Arrange to have a "meet-and-greet" event where interested parents get to meet each other, cultivate trust, and get the initiative rolling.	
5. Notify your local police division about the WSB week project at your school. Show your local police your **School Map** so they can help you better. Tell them which routes families will be walking and request extra police eyes on these routes if possible. Invite them to the "meet-and-greet" event.	
6. Ask the police to assist with a school assembly to remind students of pedestrian safety rules.	
7. Show your local municipal councillor and traffic engineer your **School Map**. Ask if they are aware of any areas that could pose conflicts between pedestrians and vehicles. If so, ask if they can assist to make these routes safer for the pedestrians.	
8. Distribute a WSB tool kit to each family who intends to participate.	

NOTE: *In some school districts police reference checks are mandatory for all parent volunteers. If your school decides to use this reference check service for Walking School Bus parent volunteers, check with your local police station about the process and the fee charged.*

5.2 Walking School Bus – Sample Promotional Letter

Several schools across Ontario have one or more Walking School Buses organized. Walking School Buses promote cleaner air, as well as a safe way to school for children and increased physical activity. Below is a sample letter for schools to send to parents to promote the Walking School Bus, which can also be found on the Active and Safe Routes to School Web site. For further information about the Walking School Bus and other Active and Safe Routes to School initiatives, refer to: www.saferoutestoschool.ca

Dear Parents,

As you know, we have been working for some time to reduce the traffic congestion around our school and promote safer and healthier alternatives. We have participated in International Walk to School Day and hold regular Walking Wednesdays. Our students and parents are to be congratulated for their efforts in supporting these important initiatives.

We would like to encourage families to walk to school on a more regular basis, rather than just on Wednesdays. We know some of you are already doing this and we thank you for setting a great example for the rest of us.

To this end we are promoting Walking School Bus Week at our school, to be held (*fill in dates here*). The attached flyer will give you more details on this program. If you are interested in participating in Walking School Bus Week please complete the form on the back of the flyer and send it back to the school with your child.

It may not be possible for your family to walk every day but if you can do it just two or three days a week it would be better than not at all. If we all do a little we'll achieve a lot!

Participating families will receive a Walking School Bus kit that includes useful information on organizing a Walking School Bus as well as stickers for the students and ideas on how to make your daily walk safe and enjoyable.

Walking School Bus Week is an initiative of Greenest City's Active & Safe Routes to School program. Greenest City coordinates this project across Ontario and you can visit their Web site at www.greenestcity.org to learn more about them and their other programs.

Signed by Principal

5.3 Bulletin – Smog Alert Today

The Region of Waterloo sent out information packages to 300 organizations, including daycares, schools, and community centres. The packages had a tool kit in it with posters and brochures pertaining to health protection and promotion. Below is a template of a bulletin to be posted in the building the day of a smog alert. This can be useful for any organization with outdoor workers, students, or for posting in municipal buildings for internal notification. For further information about external notification, please see Section 2, page 14.

NOTICE:

SMOG ALERT!

The Ontario Ministry of the Environment has issued an air quality advisory for

TODAY

Please plan to implement the appropriate actions recommended by ______________________ and those that have been identified for this organization to take during a Smog Alert.

5.4 Bulletin – Smog Alert Tomorrow

The Region of Waterloo sent out information packages to 300 organizations, including daycares, schools, and community centres. The packages had a tool kit in it with posters and brochures pertaining to health protection and promotion. Below is a template of a bulletin to be posted in the building the day before a smog alert. This can be useful for any organization with outdoor workers, students, or for posting in municipal buildings for internal notification. For further information about external notification, please see Section 2, page 14.

NOTICE:

SMOG ALERT!

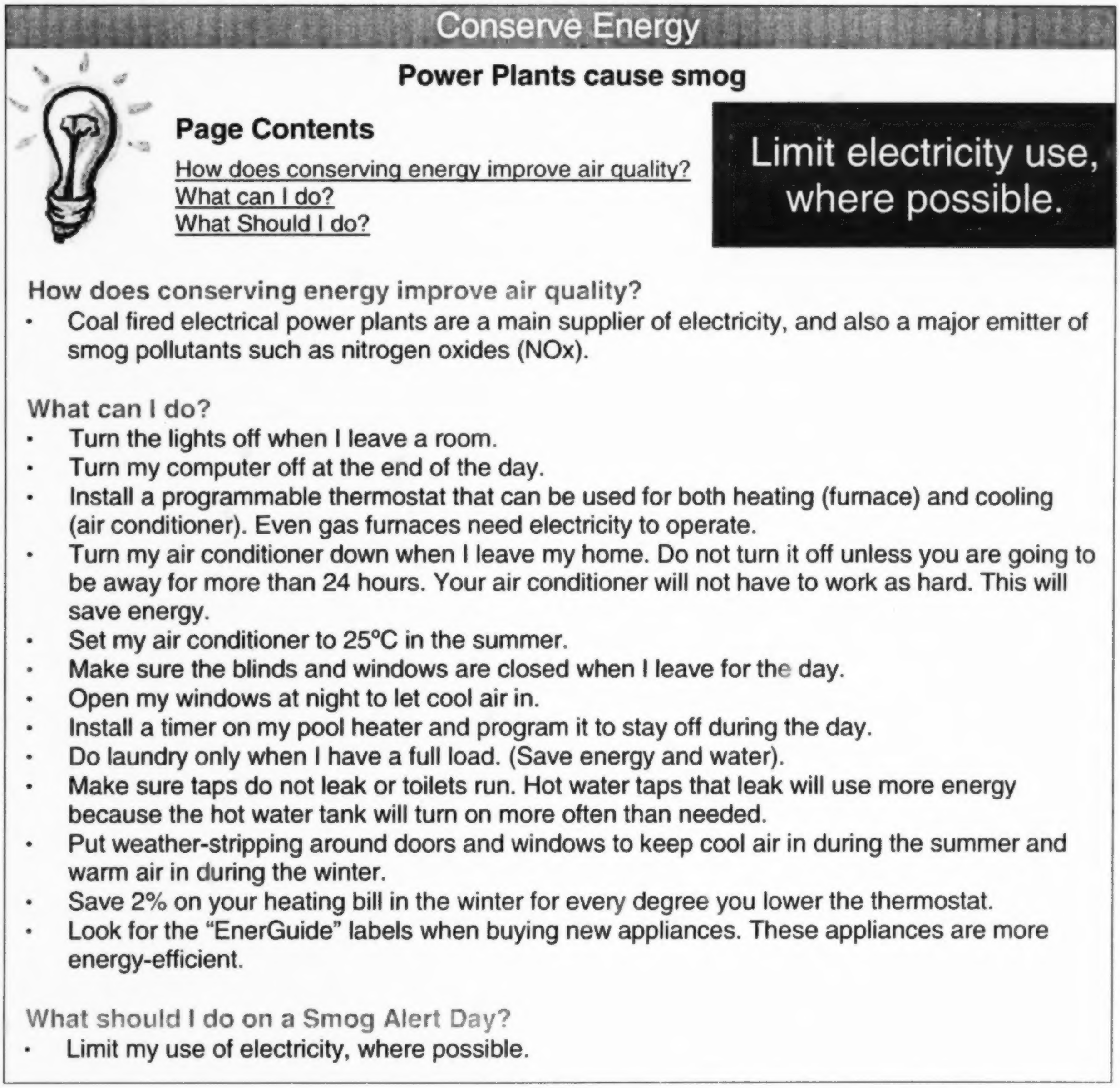
The Ontario Ministry of the Environment has issued an air quality advisory for

TOMORROW

Please plan to implement the appropriate actions recommended by____________________ and those that have been identified for this organization to take during a Smog Alert.

5.5 Web Page Promoting Energy Conservation

The electricity industry is one of the largest industrial sources of smog-causing pollutants. Therefore, energy conservation in an important initiative when working towards improved air quality. One key way to inform the public about the importance of energy conservation is with a Web site dedicated to the topic. The Regional Municipality of Halton put together a web page that discusses why energy conservation helps to improve air quality, what steps people can take at home to conserve energy, and what can be done on smog alert days to further increase energy conservation. For more information about energy conservation, please refer to page 24.



Conserve Energy

Power Plants cause smog

Page Contents

How does conserving energy improve air quality?
What can I do?
What Should I do?

Limit electricity use, where possible.

How does conserving energy improve air quality?

- Coal fired electrical power plants are a main supplier of electricity, and also a major emitter of smog pollutants such as nitrogen oxides (NOx).

What can I do?

- Turn the lights off when I leave a room.
- Turn my computer off at the end of the day.
- Install a programmable thermostat that can be used for both heating (furnace) and cooling (air conditioner). Even gas furnaces need electricity to operate.
- Turn my air conditioner down when I leave my home. Do not turn it off unless you are going to be away for more than 24 hours. Your air conditioner will not have to work as hard. This will save energy.
- Set my air conditioner to 25°C in the summer.
- Make sure the blinds and windows are closed when I leave for the day.
- Open my windows at night to let cool air in.
- Install a timer on my pool heater and program it to stay off during the day.
- Do laundry only when I have a full load. (Save energy and water).
- Make sure taps do not leak or toilets run. Hot water taps that leak will use more energy because the hot water tank will turn on more often than needed.
- Put weather-stripping around doors and windows to keep cool air in during the summer and warm air in during the winter.
- Save 2% on your heating bill in the winter for every degree you lower the thermostat.
- Look for the “EnerGuide” labels when buying new appliances. These appliances are more energy-efficient.

What should I do on a Smog Alert Day?

- Limit my use of electricity, where possible.

6. USEFUL LINKS

Active and Safe Routes to School
As the name suggests, this Web site promotes active and safe routes to school. It contains information about how to organize a Walking School Bus, as well as how schools can help reduce the amount of idling that occurs when parents drop off and pick up their children: www.saferoutestoschool.ca

Association of Municipalities of Ontario
General Web site: www.amo.on.ca
Links to Municipal Home Pages: http://199.202.235.157/ylg/ontario.html

Clean Air Partnership
A registered charity, the Clean Air Partnership works with partners to achieve clean air, facilitate the exchange of ideas, advance change and promote and coordinate the implementation of actions to improve local air quality: www.cleanairpartnership.org

Environment Canada
General Clean Air Page: www.ec.gc.ca/air/introduction_e.html
Smog Page: www.ec.gc.ca/air/smog_e.html
Environmental Choice Program: www.environmentalchoice.com

Green Communities Association
An umbrella group for not-for-profit environmental organizations across Canada, the Web site provides information on initiatives that can be implemented to create environmentally active communities: http://www.gca.ca
Members list and Web site links: www.gca.ca/indexcms/index.php?organizations

Health Canada
Health and Air Quality: www.hc-sc.gc.ca/hecs-sesc/air_quality/index.htm
Smog and Your Health: www.hc-sc.gc.ca/english/iyh/environment/smog.htm

Natural Resources Canada
Idle Free Zone: oee.nrcan.gc.ca/idling/home.cfm
Personal Vehicles Initiatives: oee.nrcan.gc.ca/vehicles/home.cfm

Ontario Medical Association
Smog Wise: www.oma.org/phealth/smogmain.htm

Ontario Ministry of the Environment
Air Quality Ontario: www.airqualityontario.com/
Smog Alert Sign Up: www.airqualityontario.com/alerts/signup.cfm
Air Quality in Ontario 2003 Report: www.ene.gov.on.ca/envision/techdocs/4949e.pdf

Toronto Environmental Alliance
A not-for-profit environmental organization that undertakes research, education and action on environmental issues and provides and activist voice to local Toronto environmental issues: www.torontoenvironment.org